conga-IGX Mini ITX SBC

Mini-ITX Professional Series single board computer based on AMD Embedded G-Series SoC

User's Guide

Revision 0.2 (Preliminary)

Revision History

Revision	Date (yyyy.mm.dd)	Author	Changes
0.1	2014.05.13	AEM	• Preliminary release
0.2	2014.05.28	AEM	• Updated section 12.1 “System Watchdog (WD)” and section 15.1.1 “If you want to open the Boot Menu Immediately” • Deleted section 17.1 “Erase Disk” and section 22.6.1 “Diagnostic Program” because the conga-IGX does not support these features.

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This user's guide provides information about the components, features and connectors available on the conga-IGX Mini-ITX SBC (Single Board Computer).

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Terminology

Term	Description
SBC	Single Board Computer
SoC	System on Chip
PCI Express (PCIe)	Peripheral Component Interface Express – next-generation high speed Serialized I/O bus
PCI Express Lane	One PCI Express Lane is a set of 4 signals that contains one differential line for transmitter and one differential line for receiver. Clocking information is embedded into the data stream.
x1, x2, x4, x16	x1 refers to one PCI Express Lane of basic bandwidth; x2 to a collection of two PCI Express Lanes; etc. Also referred to as x1, x2, x4 or x16 link.
VGA	Video Graphics Array
USB	Universal Serial Bus
SATA	Serial AT Attachment: serial-interface standard for hard disks
AC ‘97/HDA	Audio CODEC (Coder-Decoder) / High Definition Audio
LPC	Low Pin-Count Interface: a low speed interface used for peripheral circuits such as Super I/O controllers, which typically combine legacy-device support into a single IC.
I²C Bus	Inter-Integrated Circuit Bus: is a simple two-wire bus with a software-defined protocol that was developed to provide the communications link between integrated circuits in a system.
SM Bus	System Management Bus: is a popular derivative of the I²C-bus.
SPI Bus	Serial Peripheral Bus
GBE	Gigabit Ethernet
LVDS	Low-Voltage Differential Signaling
TPM	Trusted Platform Module
HDMI	High Definition Multimedia Interface
DVI	Digital Visual Interface
S/PDIF	Sony/Philips Digital Interface Format
DDC	Display Data Channel is an I²C bus interface between a display and a graphics adapter.
N.C.	Not connected
N.A.	Not available
T.B.D.	To be determined

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1 Safety Instructions

Do not connect or disconnect any cables or modules to or from any onboard connectors (except for the rear I/O connectors) until the conga-IGX is completely powered down.

Any damage caused to the conga-IGX by misuse of the onboard connectors is excluded from the standard warranty. congatec cannot be held liable for any damage that results from incorrect use of any onboard connectors.

The system integrator is fully responsible for the usage of the appropriate connectors and cables in order to fulfill the technical requirements (electrical contact, durability, power/current levels, signal integrity etc.)

Heatsink Backplate

Caution

Insulating foil of backplate must NOT be removed, otherwise conga-IGX may be damaged due to a possible short circuit.

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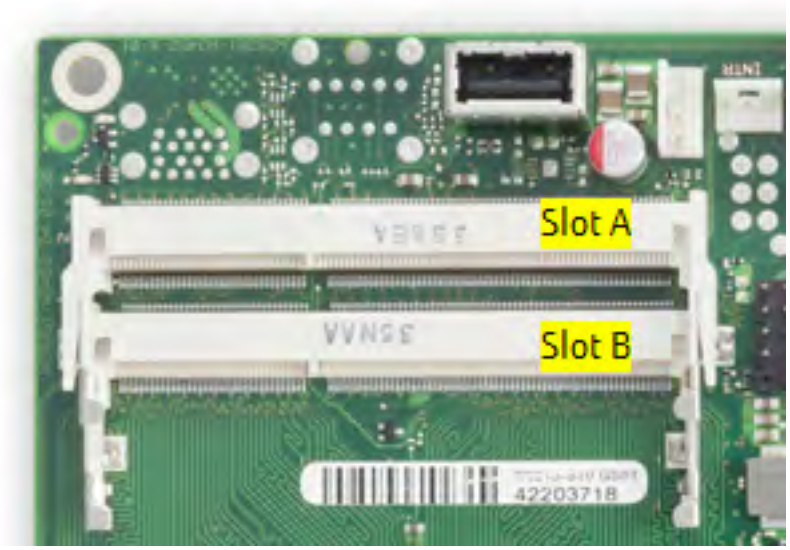
2 System Memory Configuration

If you use only one memory module, then you must insert this memory module into slot A (upper slot), otherwise the conga-IGX will not operate.

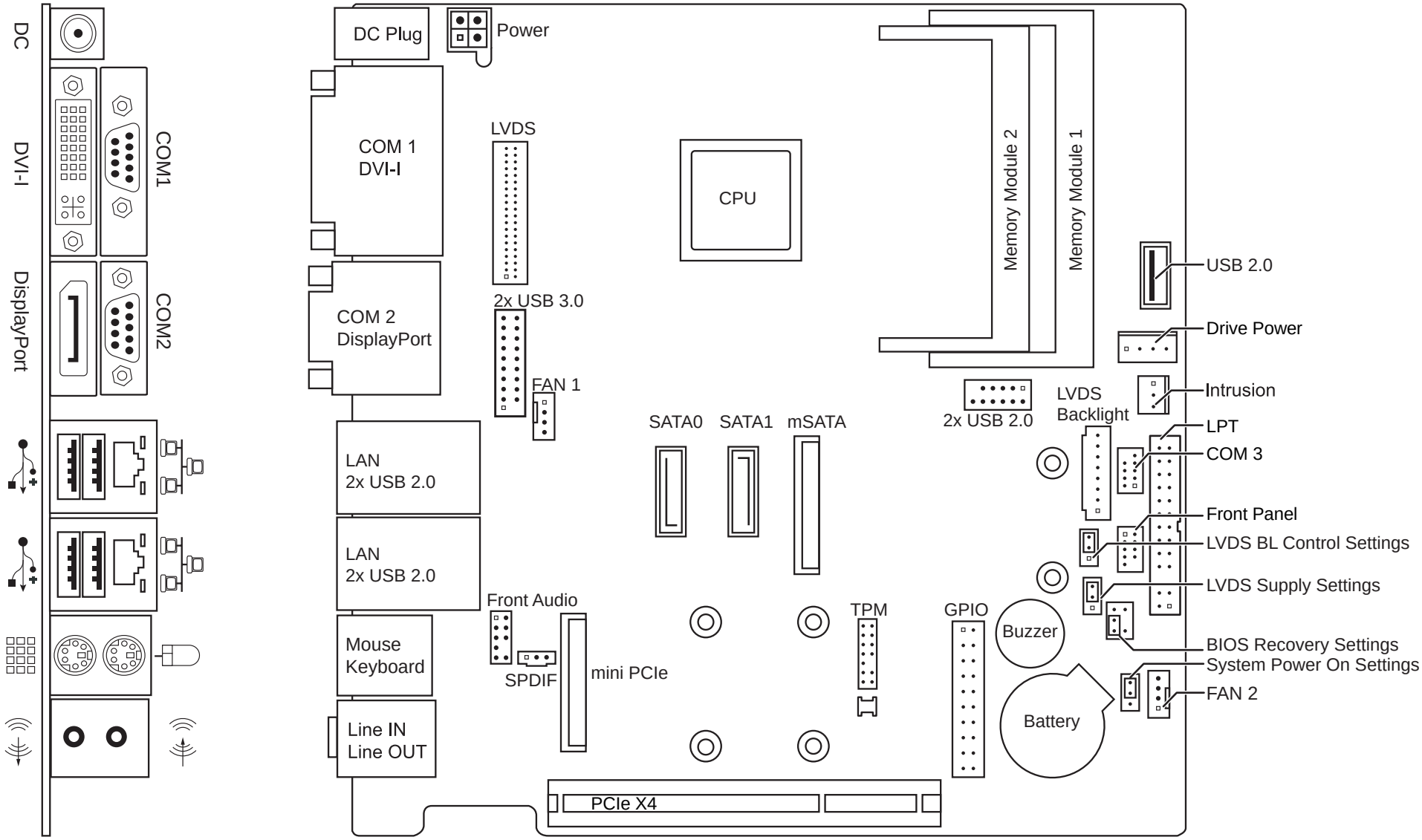


Note

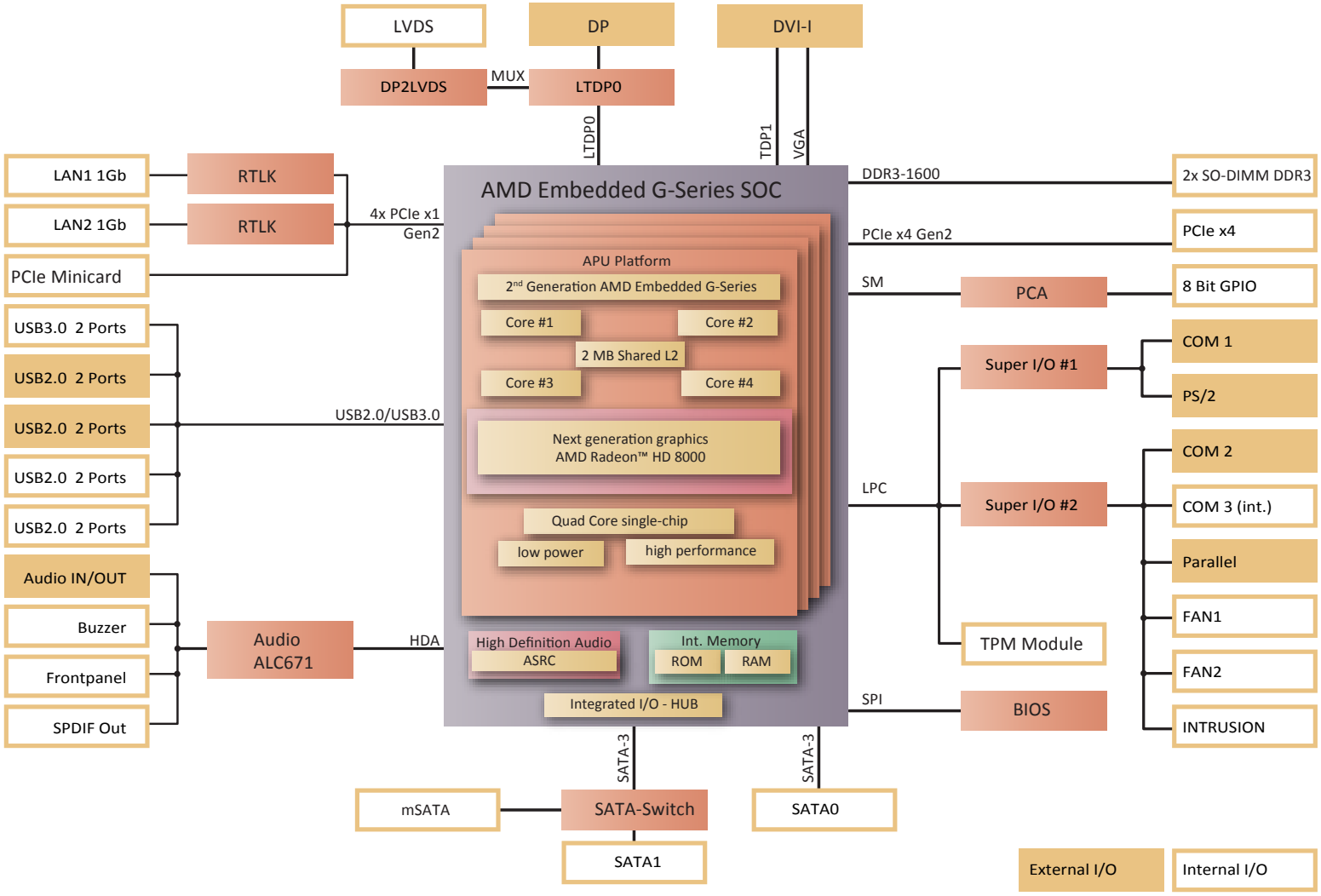
The conga-IGX will not operate if memory slot A is empty.

3 Feature Overview conga-IGX

3.1 conga-IGX Reference Silkscreen



3.2 Block Diagram



3.3 USB Structure

USB Port #	Location	USB Version	USB Controller	USB Fuse
0-3	Rear USB ports (IO-Shield)	1.1	OHCI 1	common fuse 5V/2A (see note below)
		2.0	EHCI 1	
4-7	Pin Header (4,7) Internal “Stick” Port (5) Mini-PCIe (6)	1.1	OHCI 2	common fuse 5V/2A (see note below)
		2.0	EHCI 2	
8-9	USB3 Header (xHCI disabled)	1.1	OHCI 3	common fuse 5V/2A (see note below)
		2.0	EHCI 3	
	USB3 Header (xHCI enabled)	1.1	xHCI	
		2.0		
		3.0		

Note

Specified maximum USB supply current: 0.5A/5V for each USB2.0 port; 0.9A/5V for each USB3.0 port.

Internal USB Cable Length:

USB 2.0: Board will only support USB specification compliant cables with a maximum length of 12 inches (30.5cm) for USB 2.0. The cables must have an impedance of 90 ohms. Furthermore, the cables must have a twisted signaling pair for each individual port. That means each port has two twisted signaling pairs and one GND cable and one power cable in one jacket with inner and outer shield. The shield of the cable must be connected with the GND of the connector. These cables can be connected to the internal dual channel connector. For further details see section 6 in the USB 2.0 specification.

USB 3.0: conga-IGX will only support USB 3.0 compliant cables with a maximum length of 16 inches (40.5cm) (internal USB cable to the USB connector type A). The differential characteristic impedance for the SDP pairs is recommended to be within 90 Ω +/- 7 Ω. USB 3.0 cables have eight primary conductors: three twisted signal pairs for USB data paths and a power pair. In addition to the twisted signal pair for USB 2.0 data path, two twisted signal pairs are used to provide the SuperSpeed data path, one for the transmit path and one for the receive path. USB 3.0 receptacles (both upstream and downstream) are backward compatible with USB 2.0 connector plugs. USB 3.0 cables and plugs are not intended to be compatible with USB 2.0 upstream receptacles.

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3.4 conga-IGX Variants

	Processor (SoC)	Graphics	Memory	Display Options
conga-IGX/210HA	GX-210HA Dual Core 1.0 GHz / 9W 64kB L1 Cache per Core 1MB L2 Cache shared	Radeon HD 8210E 300 MHz	DDR3 / 1333 (see note below)	1 x DVI-I; 1 x DP V1.2; 1 x LVDS 24Bit Dual Ch.; max. 2 independent displays (DVI-I & DP or DVI & LVDS)
conga-IGX/217GA	GX-217GA Dual Core 1.65 GHz / 15W 64kB L1 Cache per Core 1MB L2 Cache shared	Radeon HD 8280E 450 MHz	DDR3 / 1600 (see note below)	
conga-IGX/420CA	GX-420CA Quad Core 2.00 GHz / 25W 64kB L1 Cache per Core 2MB L2 Cache shared	Radeon HD 8400E 600 MHz	DDR3 / 1600 (see note below)	

Note

1. *Maximum supported memory clock.*
2. *For all conga-IGX variants, DDR3-1333 (CL9) or DDR3-1600 (CL11) memory modules can be installed.*
3. *Up to 16GB SDRAM (unbuffered, no ECC) is possible.*
4. *Two memory sockets available (single channel mode). Compliant with JEDEC DDR3 1.5V, DDR3L 1.35V and DDR3U 1.25V*

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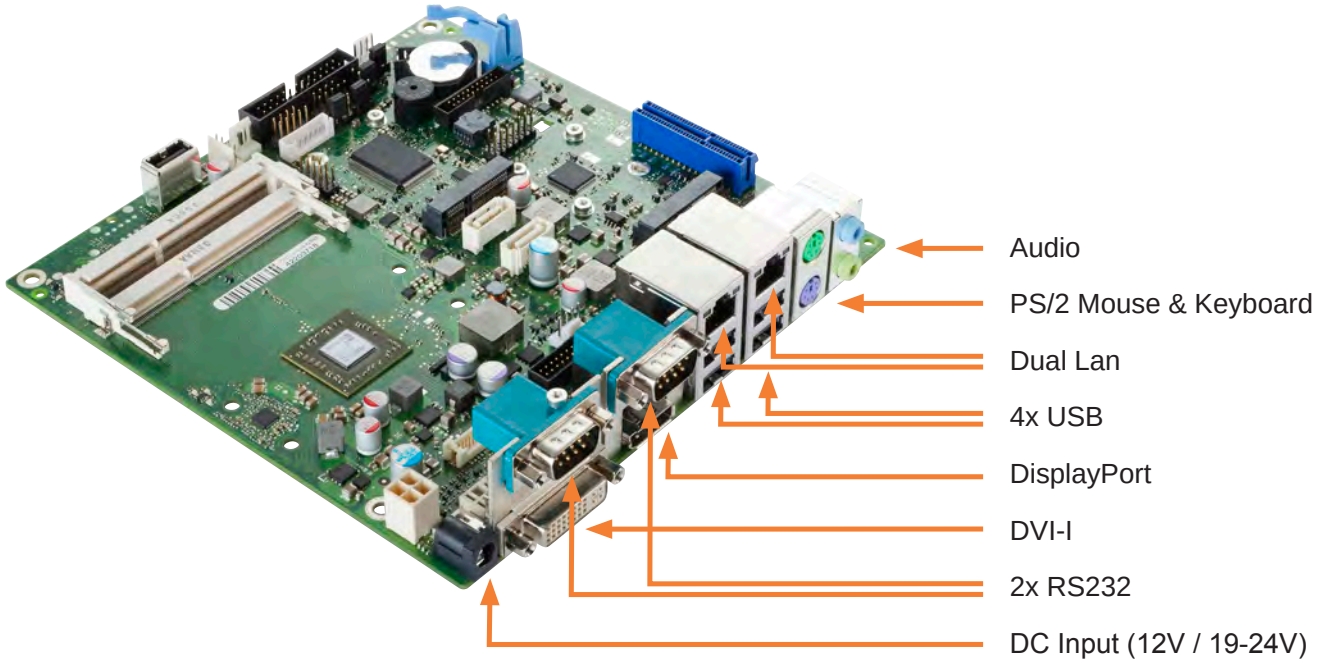
3.5 External Connectors conga-IGX



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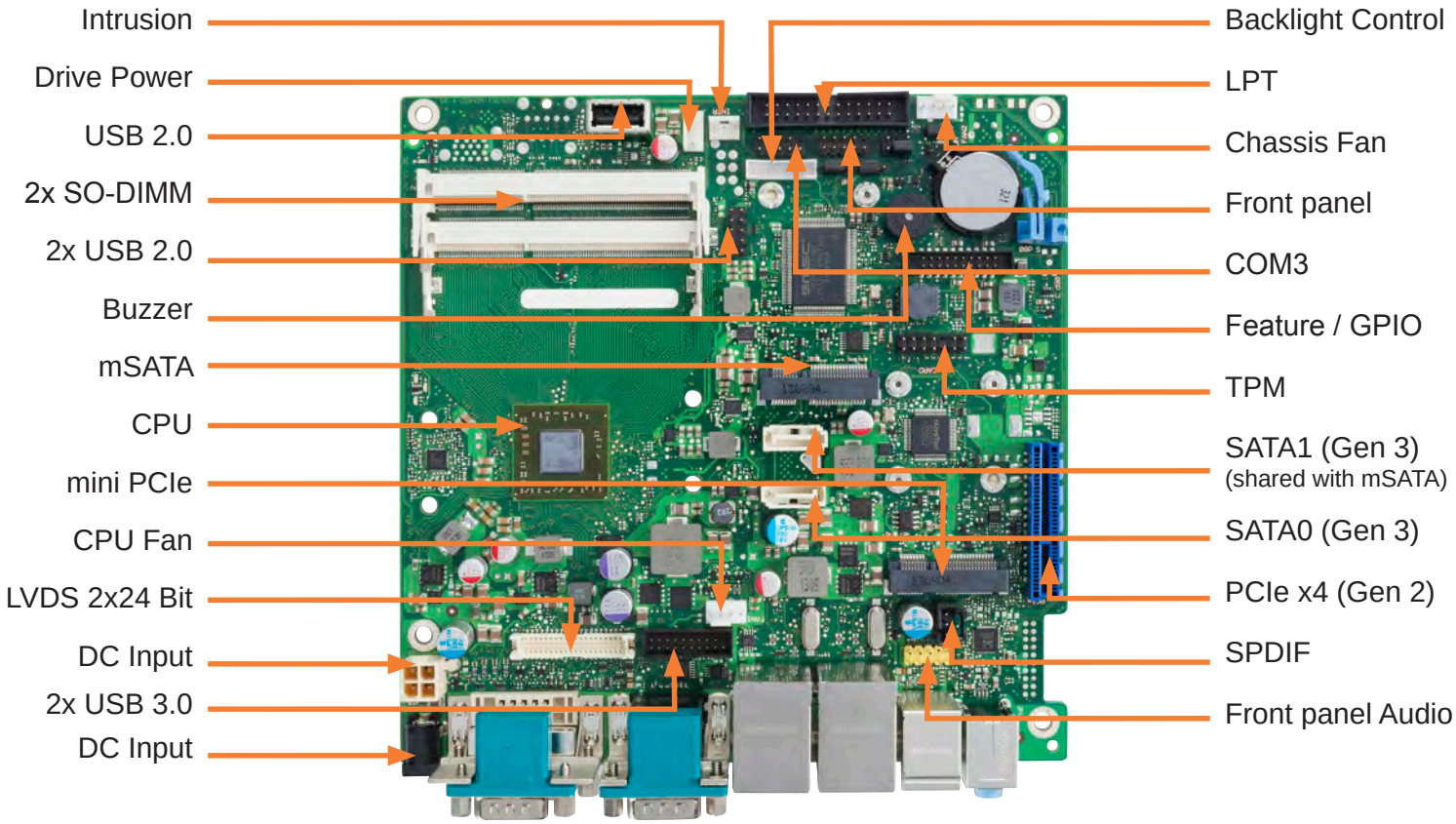
3.6 Onboard Components



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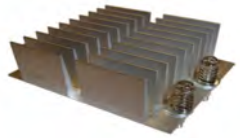
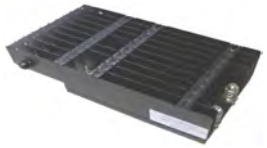
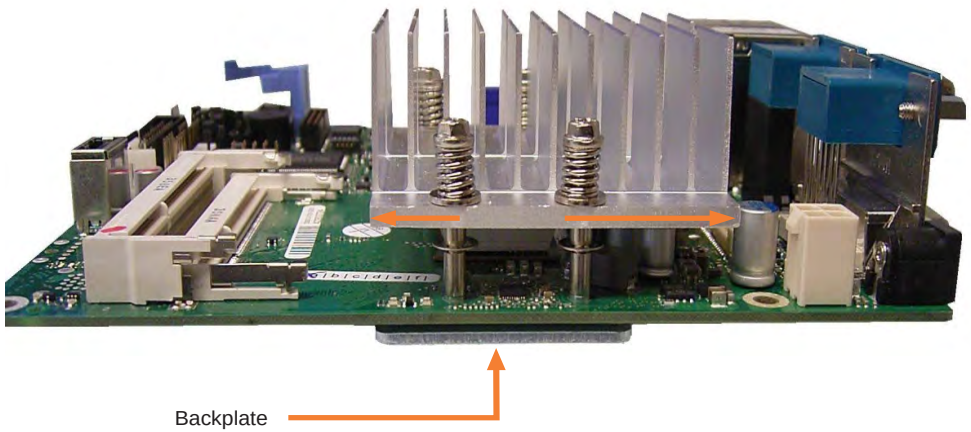
3.7 Heatsink Installation Notes

The following heatsinks are offered as accessories:

Passive Heatsink	Passive Heatsink with Heatpipes	Active Heatsink with Fan
max. CPU TDP 9W	max. CPU TDP 15W	max. CPU TDP 25W
		

Heatsink positioning:



3.8 Heatsink Installation Notes

Mounting backplate (included with heatsink):

Assembly Notes:

- Hold the heatsink with one hand so that it does not tilt while tightening the screws
- Slightly tighten each of the 4 screws so that they hold the heat sink in place. To do so, start with one screw and then slightly tighten the other screws using a crossover pattern, all the while keep holding the heat sink straight with one hand.
- Now you can fully tighten the screws. Once again start with one and then continue to tighten the other screws using a crossover pattern, all the while keep holding the heat sink straight with one hand.

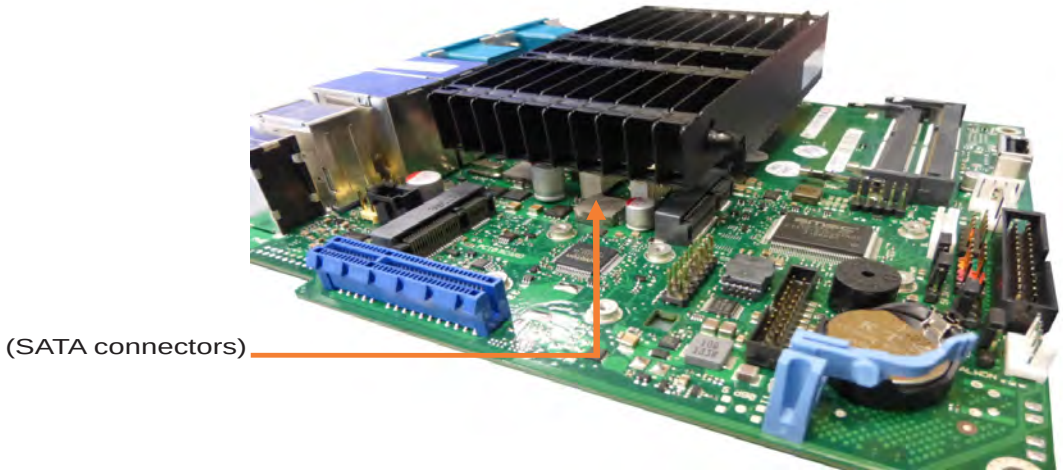
Caution

Insulating foil of backplate must NOT be removed, otherwise the conga-IGX may be damaged due to a possible short circuit.

Note

Recommended torque for heatsink screws: 0.6Nm

4 Heatsink/Heatpipe Installation Notes



Due to the required dimensions of the 15W passive heatsink with heatpipes, the onboard SATA ports are covered when the device is installed.

Note

SATA cables with angle connectors can be used when utilizing a passive heatsink with heatpipes, but they must be installed before mounting the heatsink with heatpipes.

5 Display Options

5.1 Basic Display Features

The graphics engine of the conga-IGX supports maximum 2 independent displays, following combinations are possible:

Config#	DisplayPort V1.2 Maximum 3840 x 2160	LVDS Maximum 1920 x 1200	DVI-I (digital) Maximum 1920 x 1200	DVI-I (analog VGA) Maximum 1920 x 1200
1	X		X	
2	X			X (see note below)
3		X	X	
4		X		X (see note below)

Note

Via DVI-I to VGA converter

Simultaneous use of DisplayPort and onboard LVDS is not possible; the appropriate G-series video channel can only be used exclusively for DisplayPort (=LVDS disabled in BIOS Setup) or for LVDS (=LVDS enabled in BIOS Setup).

The DisplayPort output can be converted to a HDMI output, VGA output or (second) DVI output (appropriate converter required).

Windows 8 mode (=Secure Boot enabled) & LVDS support should only be used for BIOS revision R1.1.0, otherwise any graphics output may be disabled. In case this happens, Setup Defaults should be enabled (see section Miscellaneous - BIOS/CMOS Reset).

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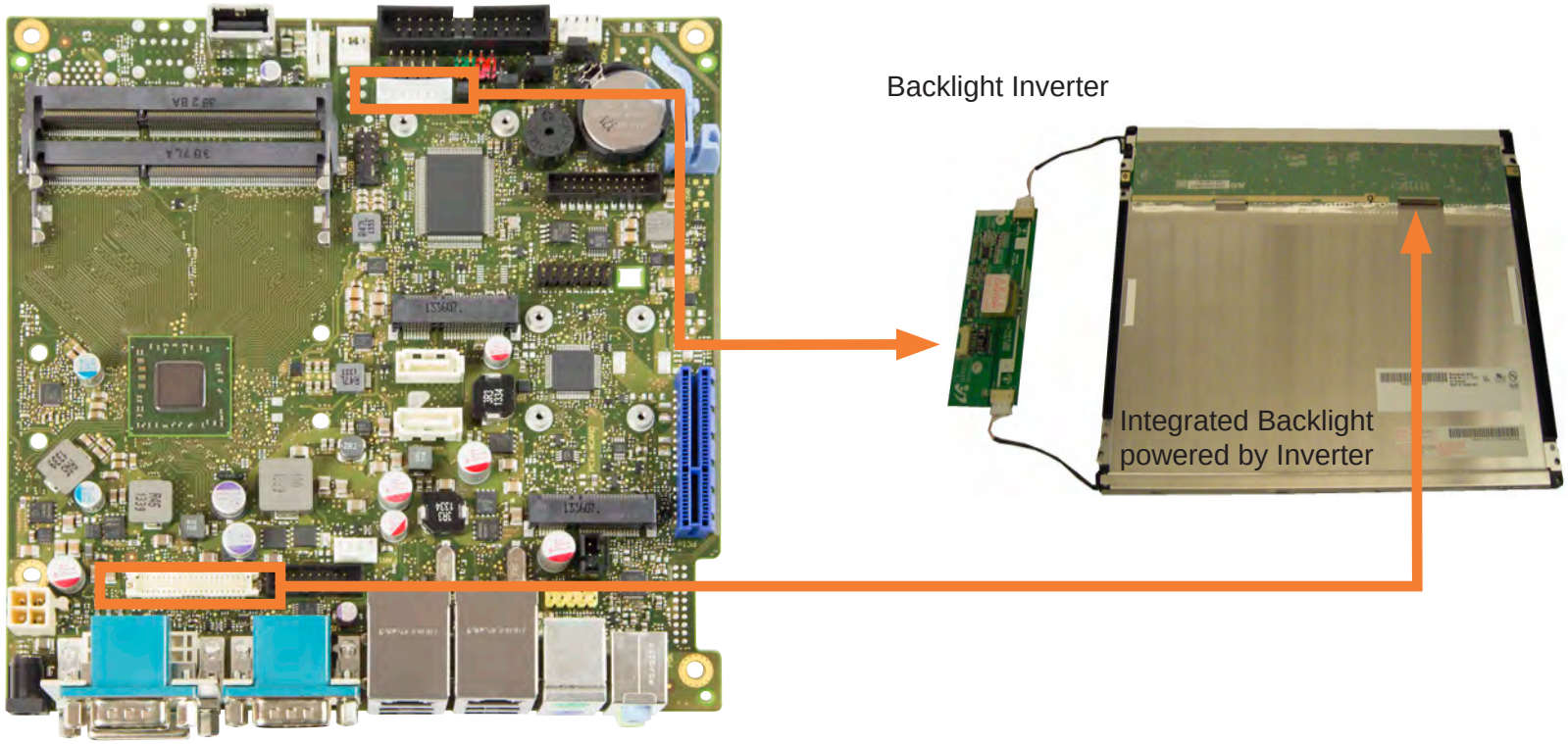
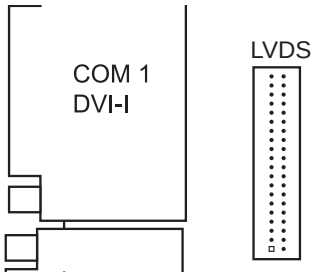
5.2 LVDS Display & Backlight Inverter Connection

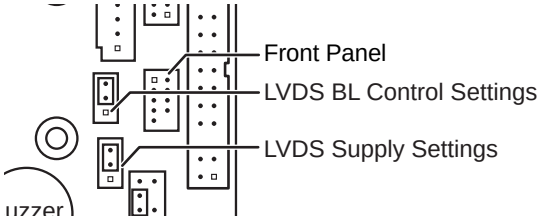


5.3 LVDS Connector details

LVDS Connector: Hirose DF13-40 (or compatible).

PIN	SIGNAL	SIGNAL	PIN
2	Ground	Ground	1
4	LVDS_H3+ (EVEN_3+)	LVDS_L3+ (ODD_3+)	3
6	LVDS_H3- (EVEN_3-)	LVDS_L3- (ODD_3-)	5
8	Ground	Ground	7
10	LVDS_H2+ (EVEN_2+)	LVDS_L2+ (ODD_2+)	9
12	LVDS_H2- (EVEN_2-)	LVDS_L2- (ODD_2-)	11
14	Ground	Ground	13
16	LVDS_H1+ (EVEN_1+)	LVDS_L1+ (ODD_1+)	15
18	LVDS_H1- (EVEN_1-)	LVDS_L1- (ODD_1-)	17
20	Ground	Ground	19
22	LVDS_H0+ (EVEN_0+)	LVDS_L0+ (ODD_0+)	21
24	LVDS_H0- (EVEN_0-)	LVDS_L0- (ODD_0-)	23
26	Ground	Ground	25
28	LVDS_CLK_H+ (CLK_EVEN_+)	LVDS_CLK_L+ (CLK_ODD_+)	27
30	LVDS_CLK_H- (CLK_EVEN_-)	LVDS_CLK_L- (CLK_ODD_-)	29
32	Ground	Ground	31
34	DDC-Data	DDC-Clock	33
36	LCD-Power (see note below)	LCD-Power (see note below)	35
38	Ground	LCD-Power (see note below)	37
40	LCD_Power_Enable	Ground	39





Note

Selectable via jumper.

Caution

Maximum load: 1A per pin.

LVDS operating voltage jumper selector:

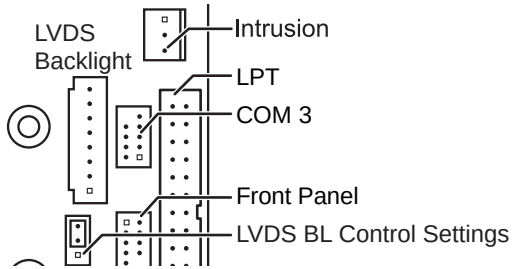
Pin	Signal
1	VCC 5V
2	Power LVDS
3	VCC 3.3V

LVDS Supply Settings

5.4 Backlight Inverter Connector Details

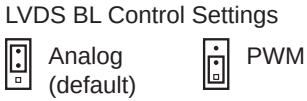
Backlight Inverter Connector: JST PHR-8

Pin	Signal	Comment
1	GND	Ground
2	GND	Ground
3	0-4V or PWM	Backlight Brightness CTRL
4	VCC	Power 5V
5	VCC	Power 5V
6	BL On/Off	Backlight On/Off Control
7	+12V	Power 12V
8	+12V	Power 12V



LVDS Backlight Brightness Control Jumper (Select analog or PWM output)

Pin	Signal
1	PWM
2	BL Brightn. Contr.
3	VCC 3.3V



Backlight Brightness Control:

Provides a variable DC voltage between 0V and 4V via an RC filter (10kOhm / 20uF; buffered output). Alternatively, a 3.3V PWM signal is available, see related jumper setting. Basically the LVDS brightness level can be selected by BIOS Setup, but it is also accessible from Windows OS (Control Panel – Power Options – Screen Brightness). Access depends on appropriate setting in BIOS Setup. If this control signal is used, the system integrator is responsible for the implementation of a backlight converter that fits to the control output voltage range.

Backlight On/Off Control: Active High, 3.3V

Note

Polarity can be changed via BIOS Setup.

5.5 LVDS Timing & Screen Resolution

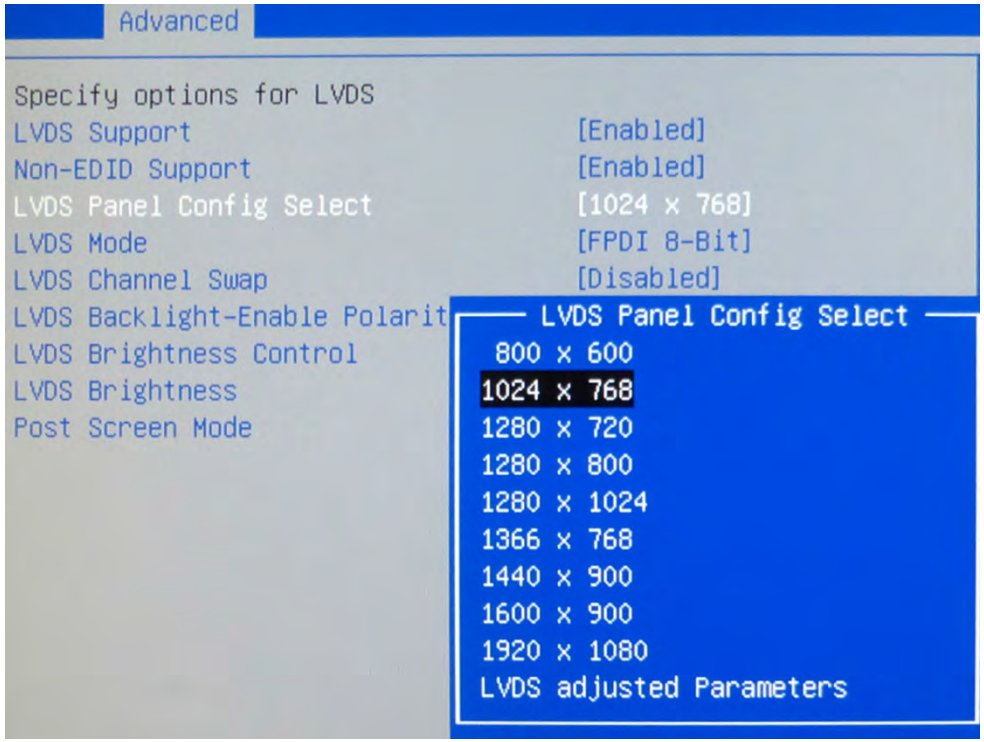
There are 9 default LVDS settings available:

- BIOS Setup Advanced - LVDS Config Select

Note

Option 10 (LVDS adjusted Parameters) becomes visible after once running the "LVDS Tool" for implementing customized LVDS settings.

"Non-EDID Support" must be set to <Enabled> for standard LVDS displays without DDC (EDID) interface.

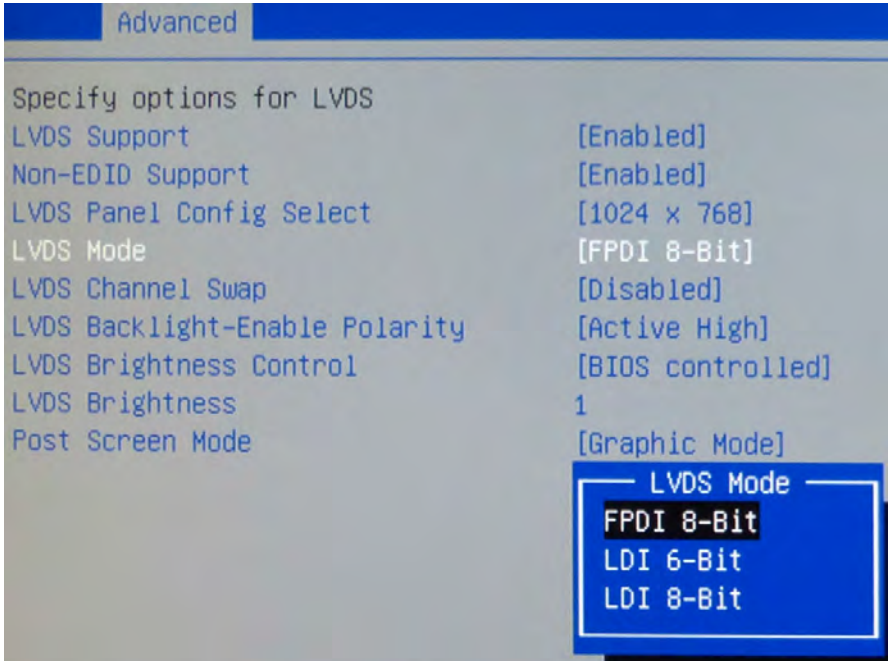


LVDS Mode:

The correct mode (FPDI/LDI) must be set for the attached LVDS panel.

Note

This setting is also required if customized LVDS timings are implemented (LVDS tool).



LVDS Brightness Control:

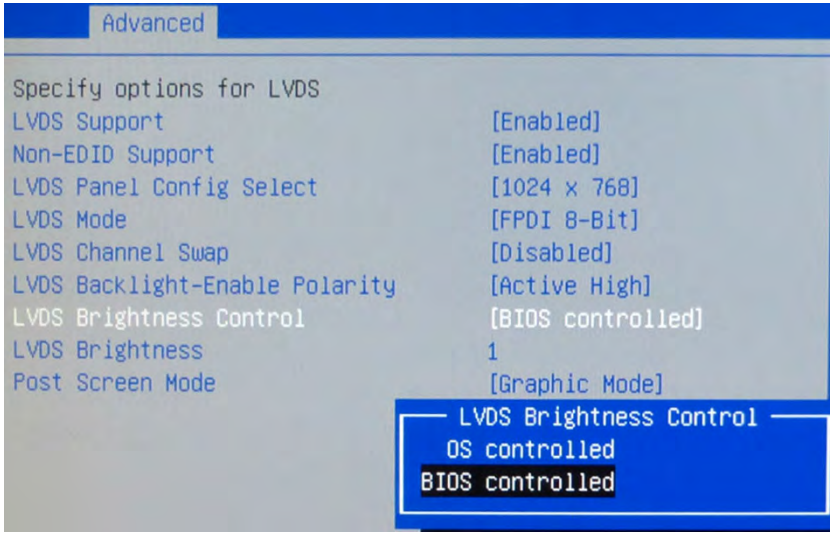
Select if the LVDS backlight brightness is controlled by BIOS or by the OS.

LVDS Brightness:

Set the level for the LVDS backlight brightness for “BIOS controlled” mode.

1 = minimum voltage level (0V) resp. minimum PWM level

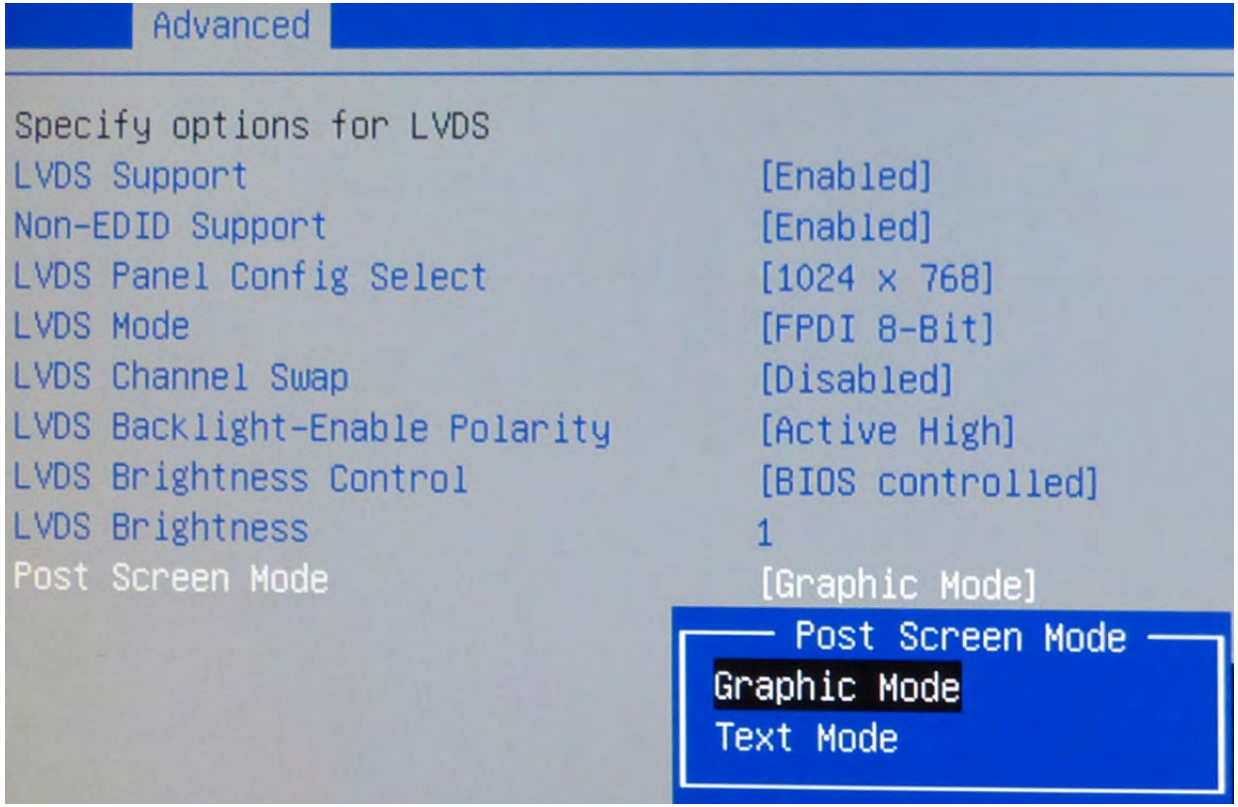
255 = maximum voltage level (4V) resp. maximum PWM level



POST Screen Mode:

Default setting = Graphic Mode (800 x 600)

For panels, 800 x 600 mode should be changed to <Text Mode> in order to enable full BIOS POST screen as well as the BIOS Setup screen (otherwise some portions of the screen may not be visible).



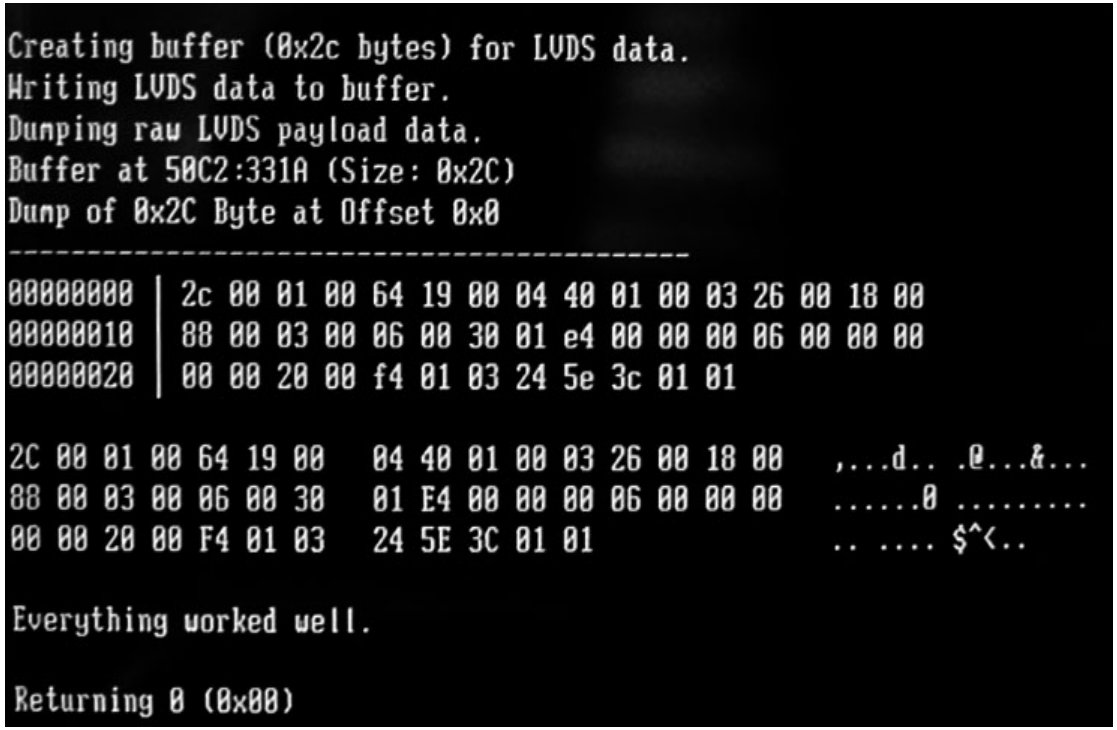
5.6 LVDS Tool

Note

The LVDS tool (DOS-based) allows flashing specific LVDS settings to the system BIOS of the conga-IGX. The LVDS tool needs a panel-specific EDID configuration file based on the specification data of the LVDS panel. Sample configuration EDID files are available in the LVDS Tool kit.

(Sample screen message after running LVDS tool)

For adjusting EDID files the “Phoenix EDID tool” is required and can be downloaded from the congatec website.



5.7 LVDS Cabling Reference

congatec does not provide LVDS cables. The user must create their own LVDS cables. Sample cabling diagrams for the following LVDS displays and related inverters are available at www.congatec.com

Display Size	TFT	Pixel	Inverter
10.4”	NEC NL6448BC33-63D	640x480	NEC104PW201
12.1”	AUO G121SN01-V0	800x600	Green-C&C GH093A
12.1”	LG-Philips LB121S03-TL01	800x600	Green-C&C GH001HB
15”	Sharp LQ150x1LW71N	1024x768	TDK CXA-0349
15”	AUO G150XG01V0	1024x768	Green-C&C GH001A
17”	AUO M170EG01-VD	1280x1024	Green-C&C GH053A
19”	Sharp LQ190E1LW01	1280x1024	Power Systems PS-DA0412-05
19”	AUO M190EG01	1280x1024	CH053(A1)

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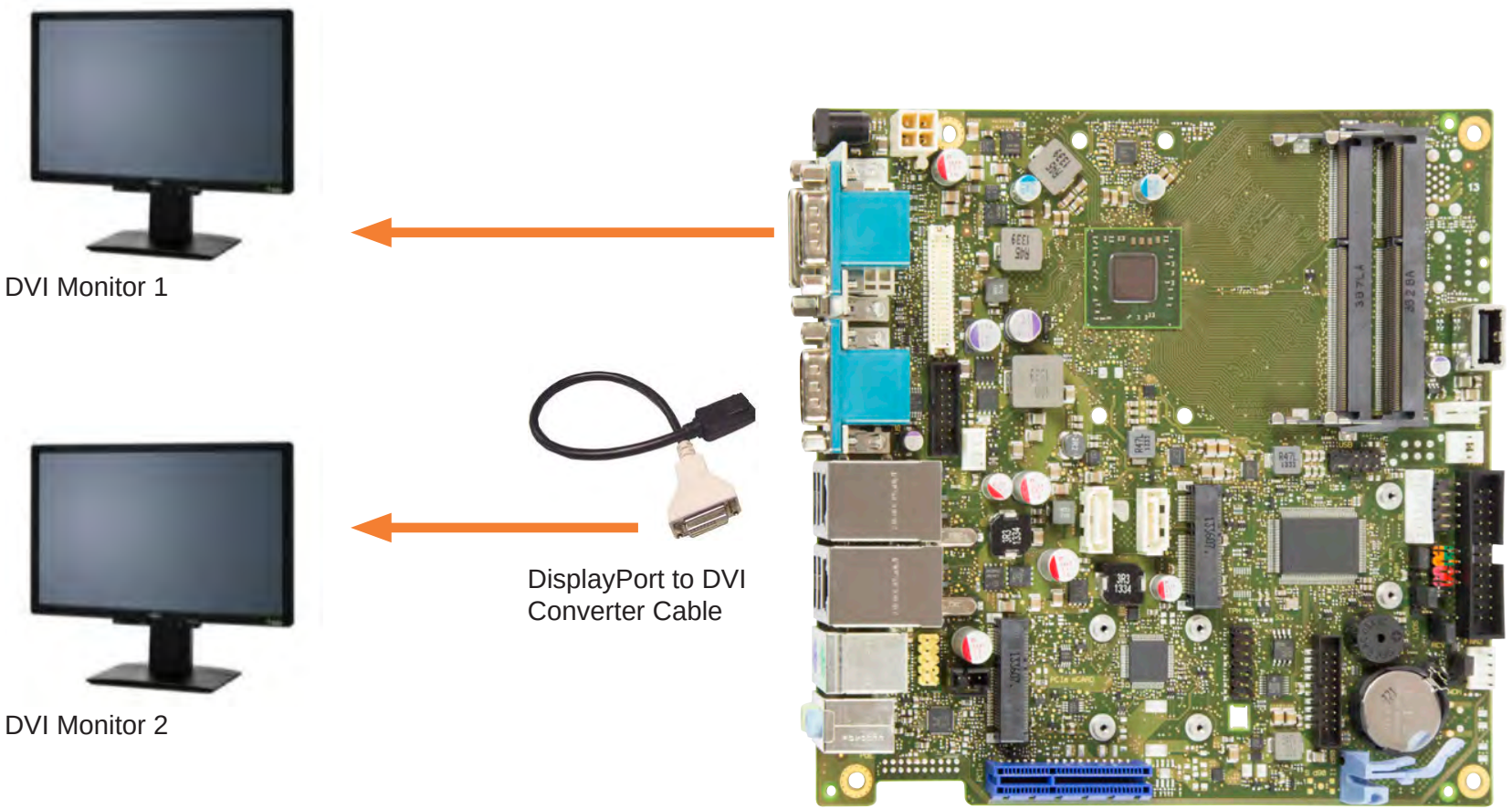
5.8 Dual-DVI Output

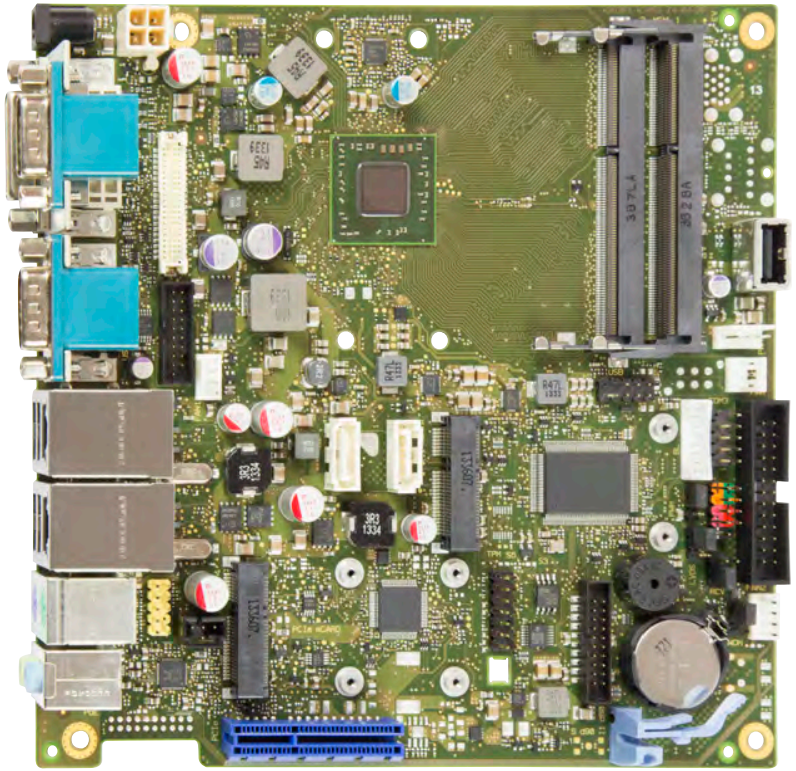


Dual Independent Display/Extended Desktop

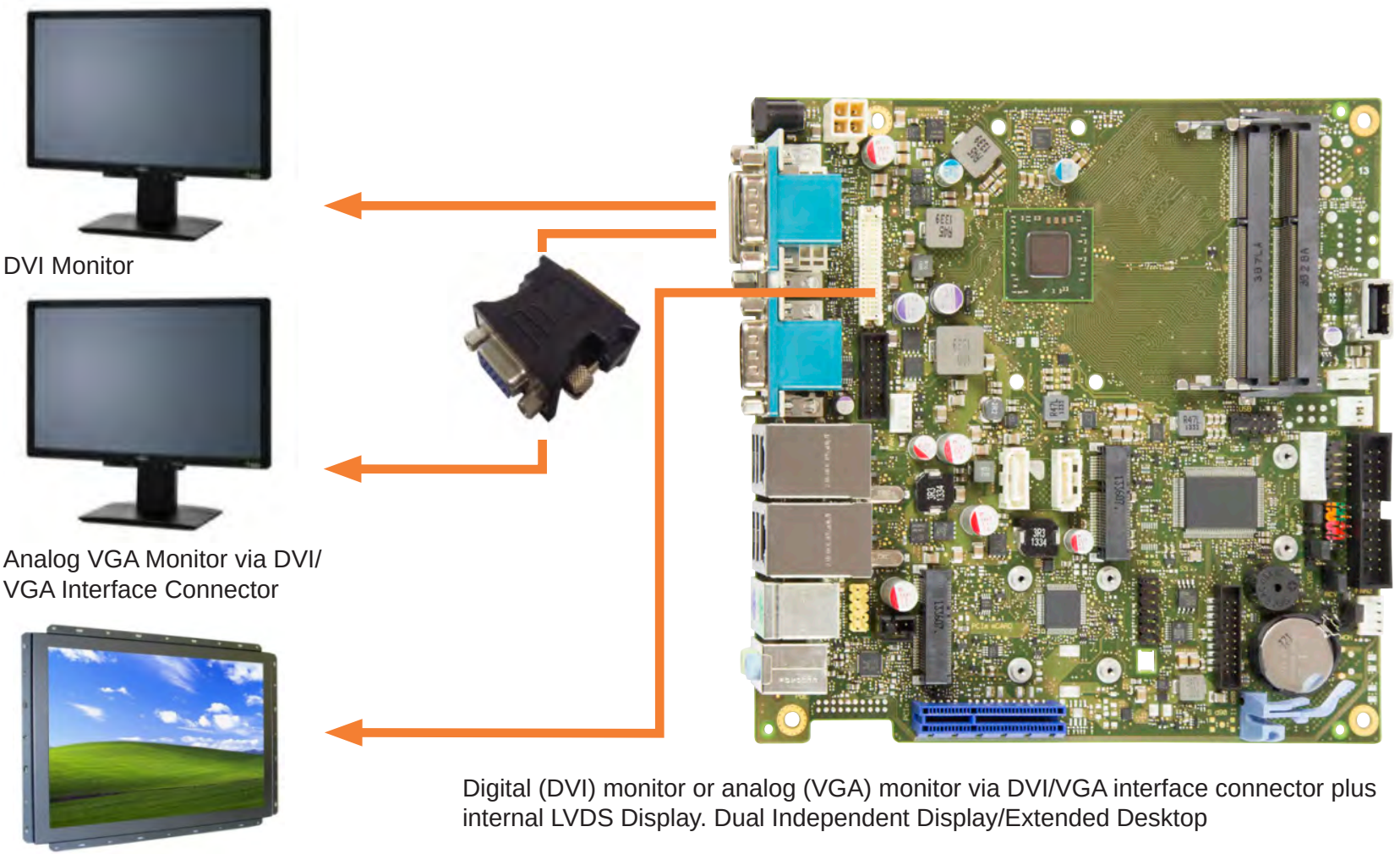
5.9 VGA Output

Analog (VGA) Monitor

DVI/VGA Interface Connector



5.10 DVI or VGA plus LVDS



DVI Monitor

Analog VGA Monitor via DVI/
VGA Interface Connector

LVDS Panel

Digital (DVI) monitor or analog (VGA) monitor via DVI/VGA interface connector plus internal LVDS Display. Dual Independent Display/Extended Desktop

Dual channel 24-bit LVDS support.
Maximum pixel rate: 138.2M
Maximum LVDS screen resolution: 1920 x 1200 @ 60Hz

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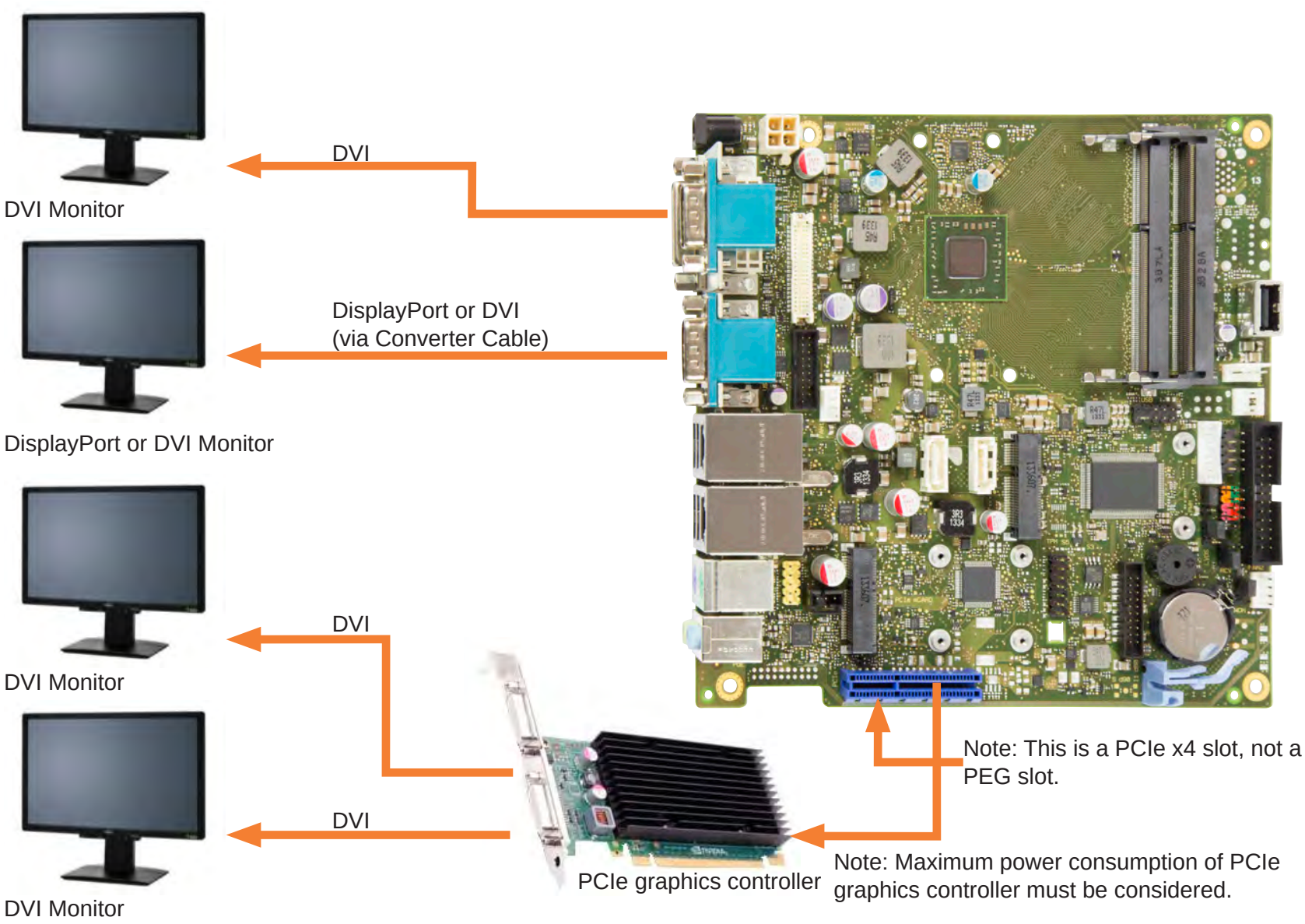
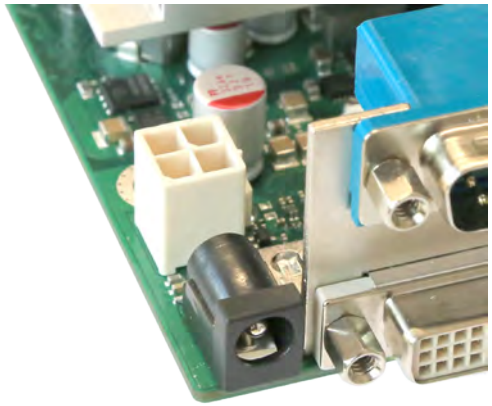
5.11 Internal & External graphics use in parallel



6 Power Supply Features

6.1 12V / 19-24V DC Connector



DC Plug

1 = + DC
2 = GND
12 V max. 60 Watt
19-24 V max. 100 Watt
Plug: 2.5 / 5.5 / 11 mm

Power

1 = GND
2 = GND
3 = + DC 12 / 19-24 V
4 = + DC 12 / 19-24 V

Internal and external DC input can be powered by 12V or 19-24V (auto range switching).

Caution

Internal and external DC input must never be powered simultaneously.

Input current for external DC connector: maximum 5A, maximum 60W @ 12V, maximum 100W @ 19-24V

Recommended plug for external AC adapter:

- Ø 2.5mm / 5.5mm
- contact length ~ 10-11mm
- Angle plug or straight plug

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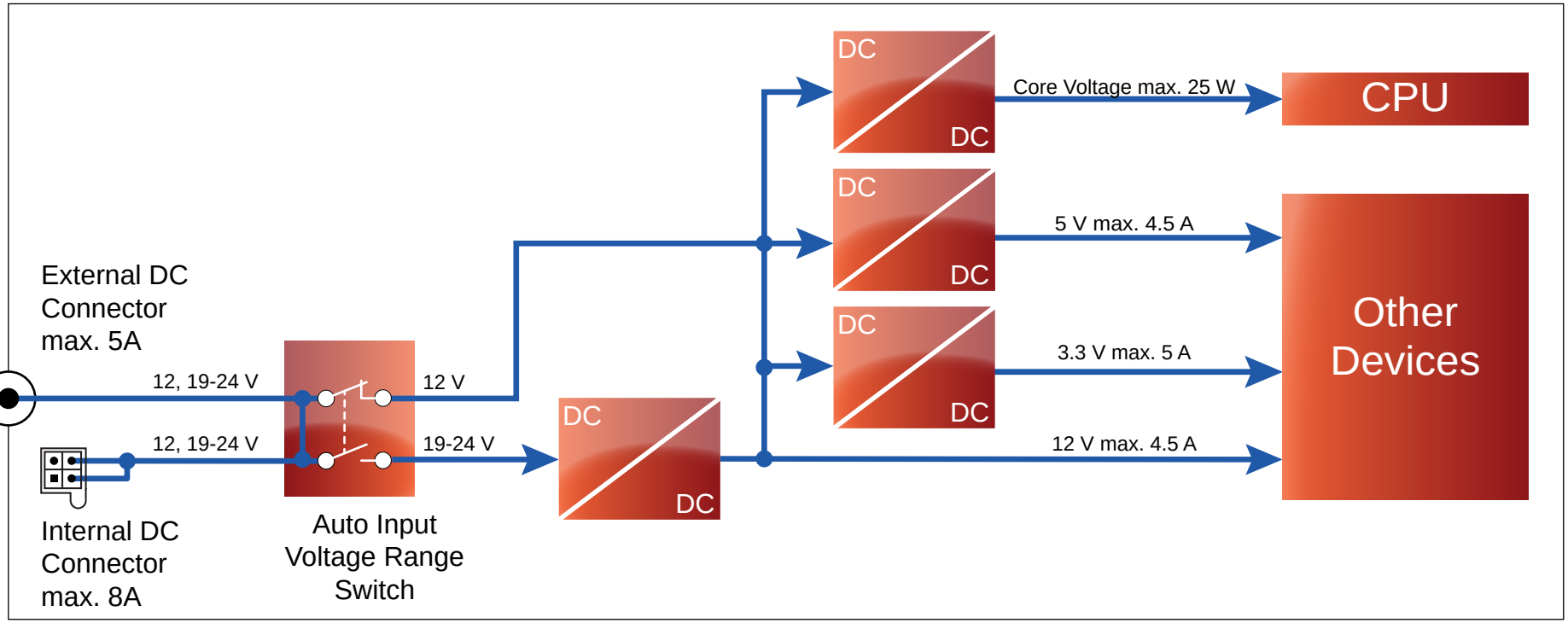
6.2 Requirements for 12V / 19-24V operation

Simplified functional diagram for major onboard voltage converters



"Other Devices" = any device that can be attached to the conga-IGX, such as fans, internal/external USB devices, (Mini-) PCIe controllers, mSATA modules, LVDS display + inverter, drives, GPIO devices etc.

Caution

Overall conga-IGX input power must never exceed 100W.

6.3 Power option for internal devices

6.3.1 Requirements for DC operation

Nominal operating range 12V or 19 - 24V

Maximum operating range 12V [+/- 10%] or 19 - 24V [+ 10% - 15%]

Ripple/noise max. 400mV (PP)

Maximum input current: 5A (external)/8A (internal)

The DC power supply input provides a capacitive load of 700µF, which has to be covered by the AC adapter respectively the DC source during power ramp-up.

6.3.2 Limited conga-IGX output current

The maximum conga-IGX output power available via (Mini-) PCIe- connector, fan-connectors, USB-connectors, GPI/O, LVDS/backlight connector, and drive power connector is limited.

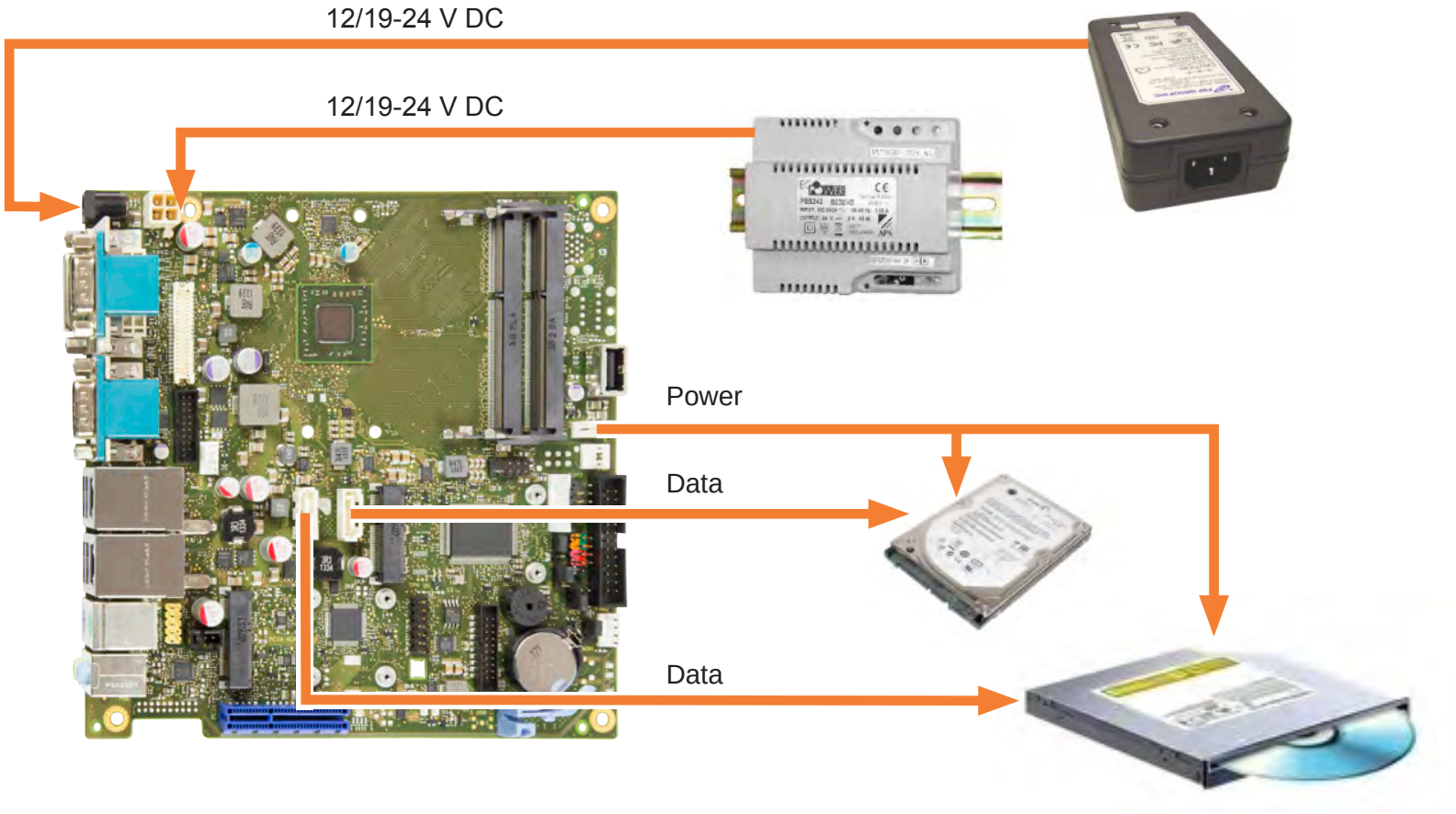
Maximum overall output current for each voltage:

- +3.3V / 5A
- +5V / 4.5A
- +12V / 4.5A

Caution

conga-IGX input power must never exceed 100W.

6.4 Drive Power Connector

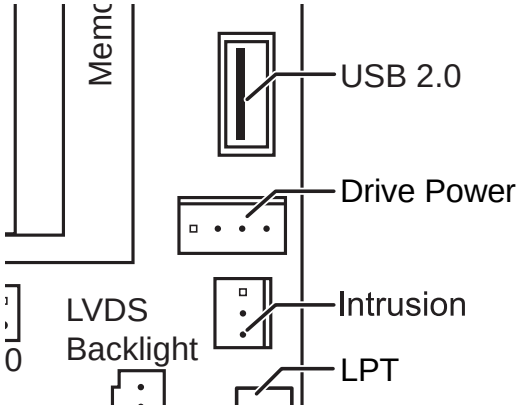


Maximum rating via Drive Power Connector:

- +5V/2A
- +12V/2A

6.5 Drive Power Connector

Pin	Signal	Comment
1	VCC (+5V)	max. 2A
2	GND	
3	GND	
4	+12V	max. 2A



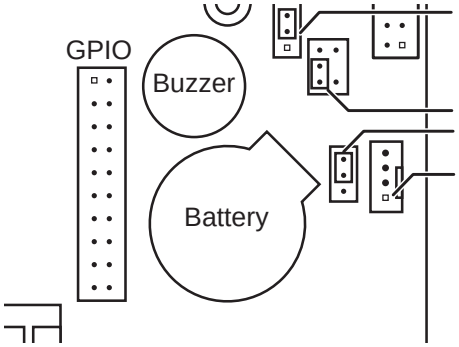
Note

Onboard connector is compliant to standard floppy power supply connector.

7 Internal Connectors

7.1 Feature Connector

8 bit 3.3V General Purpose Input/Output (GPIO) in order to attach any digital device or LEDs. Feature Connector provides additional power for internal devices (3.3V; 5V; 12V; 5Vaux; max. 1.5A per pin)



Connector Type: CompuPack R-DRK2-20-S3-SMT

Limited conga-IGX output current:

The maximum conga-IGX output power available via (Mini-) PCIe- connector, fan-connectors, USB-connectors, GPI/O, LVDS/backlight-connector, and drive power connector is limited.

Maximum overall output current for each voltage:

+3.3V	5A
+5V	4.5A
+12V	4.5A

Pin	Signal	Signal	Pin
1	GPI/O_0	GPI/O_1	2
3	GPI/O_2	GPI/O_3	4
5	GPI/O_4	GPI/O_5	6
7	GPI/O_6	GPI/O_7	8
9	VCC_3.3V	GND	10
11	VCC_3.3V	VCC_5Vaux	12
13	reserved	GND	14
15	reserved	GND	16
17	GND	VCC_5V	18
19	VCC_12V	VCC_12V	20

Caution

Maximum current per power pin is 1.5A.

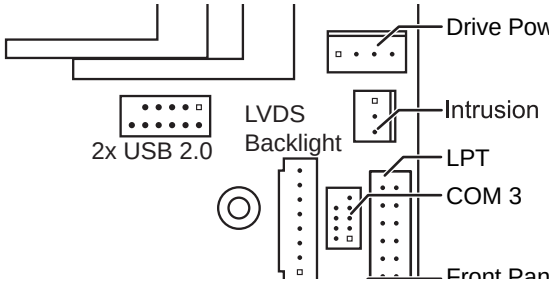
Parameter	Range
GPI/O Input Low Voltage	-0.5V … 0.8V
GPI/O Input High Voltage	2V … 3.3V
GPI/O Output Low Voltage	max. 0.7V
GPI/O Output High Voltage	min. 2.5V

Note

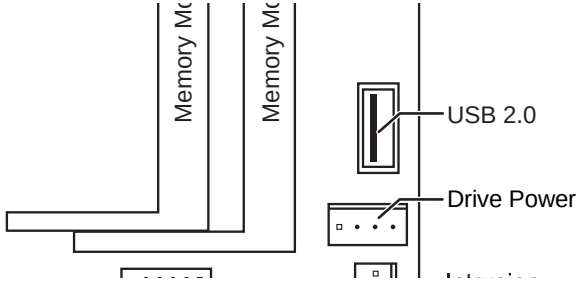
Maximum load per GPI/O pin: 10mA (overall current for all GPI/O pins must be < 85mA) Each GPI/O pin has an integrated serial resistor of 150 Ohm. GPIO access is provided via the SM-Bus controller PCA9554A. SM-Bus address: 0x78h (8-bit).

7.2 Internal USB 2.0 Ports

Pin	Signal	Pin	Signal
1	VCC AUX	2	VCC AUX
3	Data negative Port X	4	Data negative Port Y
5	Data positive Port X	6	Data positive Port Y
7	GND	8	GND
9	Key	10	Not connected



Pin	Signal
1	VCC auxiliary
2	Data negative
3	Data positive
4	GND



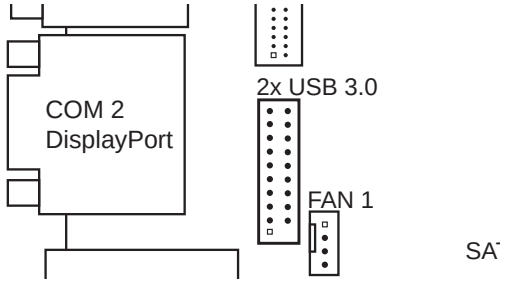
Fused with polyswitch and power supervision with over current detection

Note

External USB sticks may cause EMI/ESD issues. This can be avoided by using the internal USB port for the affected stick.

7.3 Internal USB 3.0 Ports

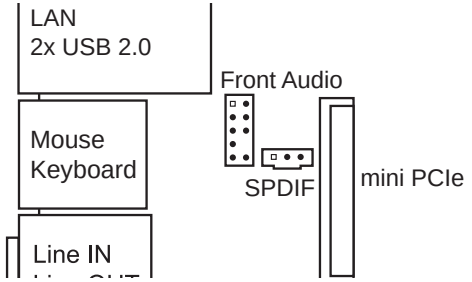
Pin	Signal	Pin	Signal
1	VCC AUX	2	USB3_RX negative (P2)
3	USB3_RX positive (P2)	4	GND
5	USB3_TX negative (P2)	6	USB3_TX positive (P2)
7	GND	8	Data negative (P2)
9	Data positive (P2)	10	FP Detect
11	Data positive (P3)	12	Data negative (P3)
13	GND	14	USB3_TX positive (P3)
15	USB3_TX negative (P3)	16	GND
17	USB3_RX positive (P3)	18	USB3_RX negative (P3)
19	VCC AUX	20	<Key>



7.4 Internal Audio Ports – Front panel Audio

Operating mode (High Definition Audio or Legacy Audio) selectable in BIOS Setup.

High Definition Audio:



Pin	Signal	Pin	Signal
1	HDA Port 1 Left	2	Analog GND
3	HDA Port 1 Right	4	FP Presence Detect
5	HDA Port 2 Left	6	Jack Sense Port 1
7	Jack Sense common	8	Key
9	HDA Port 2 Right	10	Jack Sense Port 2

Legacy Audio (AC97):

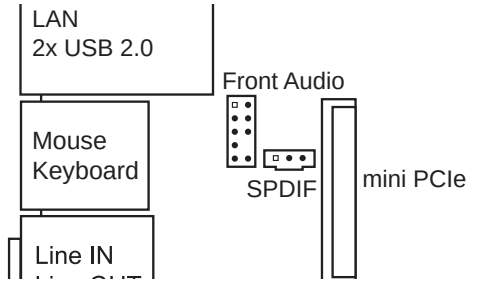
Pin	Signal	Pin	Signal
1	Mic Left	2	Analog GND
3	Mic Right	4	reserved
5	Headphone out Right	6	reserved
7	Analog GND	8	Key
9	Headphone out Left	10	reserved

Note

When using this connector in AC97/Legacy mode pay attention to pin 7. This pin is tied to GND. HP_ON# signaling on this pin is not supported.

7.5 Internal Audio Ports - SPDIF

Pin	Signal
1	VCC
2	SPDIF out
3	GND



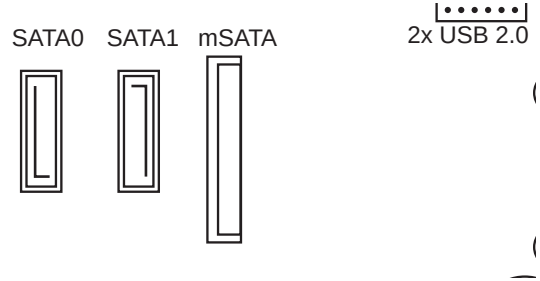
Note

Standard connector bracket should directly connect to SPDIFout and GND pins (no signal converter required).

7.6 m-SATA / SATA

Fullsize m-SATA socket

Supports modules with SATA interface.



Note

Mini-PCI-Express or USB is NOT supported by this interface.

Two SATA 3.0 connectors (up to 6Gb/s).

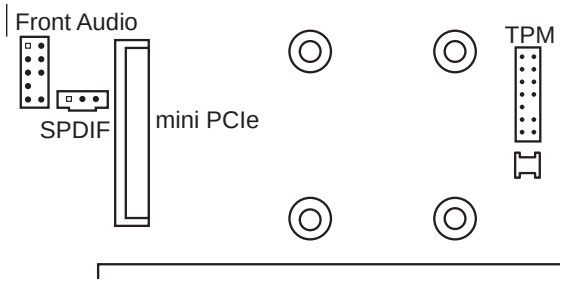
Layout prepared for SATA Disk-On-Module (powered via external power cable only).

Note

SATA-1 and mSATA are shared and can not be used simultaneously.

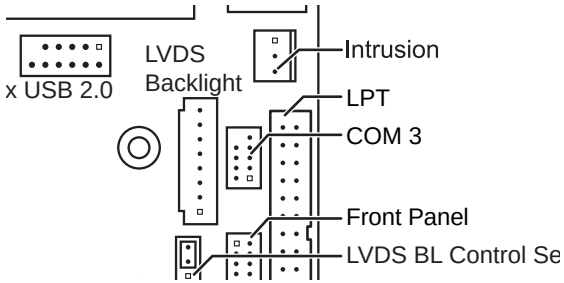
7.7 Mini-PCIe Connector

Mini-PCI Express (Gen2) connector Prepared for halfsize and fullsize modules, including USB 2.0 interface



7.8 Internal Serial Connector (COM3)

Pin	Signal	Pin	Signal
1	DCD 3	2	DSR 3
3	SIN 3	4	RTS 3
5	SOUT 3	6	CTS 3
7	DTR 3	8	RI 3
9	GND	10	Key

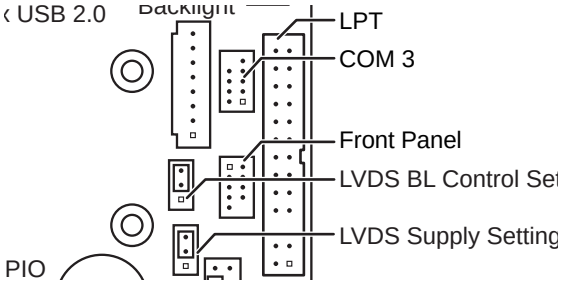


Note

Internal serial port = COM3

7.9 Internal Parallel Port Connector

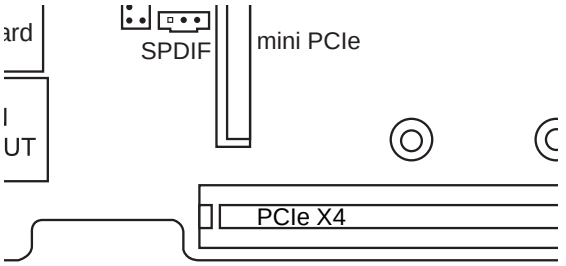
Pin	Signal	Pin	Signal
1	Strobe	2	AutoFD
3	Data0	4	Error
5	Data1	6	Init
7	Data2	8	Sel_L
9	Data3	10	GND
11	Data4	12	GND
13	Data5	14	GND
15	Data6	16	GND
17	Data7	18	GND
19	ACK	20	GND
21	Busy	22	GND
23	Empty	24	GND
25	Select	26	GND



7.10 PCI Express Extension Slot

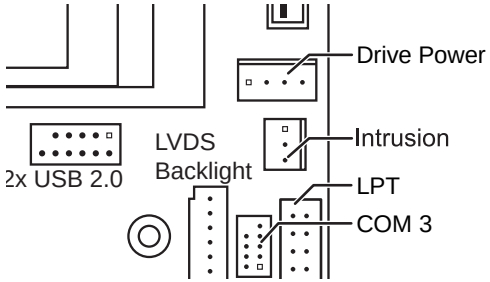
PCIe x4 (Gen2)

- Supports up to four PCIe lanes
- “open slot” including card mount for PCIe x16 cards



7.11 Intrusion Connector

Pin	Signal
1	GND
2	Case open (low asserted)
3	Intrusion switch present (low asserted)



Note

The intrusion supervision feature needs to be enabled in BIOS Setup first (Menu "Security"/"Cabinet Monitoring"). This BIOS option is only available if pin 3 ("Intrusion Switch Present") is connected to GND.

Chassis intrusion is active even if the system is switched off (S5 state) or disconnected from mains power. The intrusion event is monitored by the chipset and stored in the BIOS Eventlog during the next Boot. A timestamp (Boot date/time) will be added then.

Note

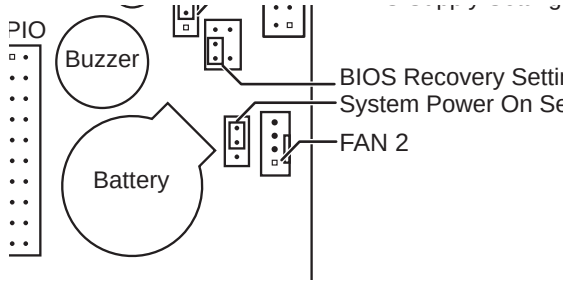
This timestamp does not represent date/time of the intrusion event.

If a Supervisor Password is enabled in BIOS Setup, the system will stop during BIOS POST if an intrusion event has been detected. In order to continue, the Supervisor Password must be entered to confirm the intrusion event.

The intrusion status can be easily monitored by using the BMCAPI (Windows)

7.12 Fan Connector

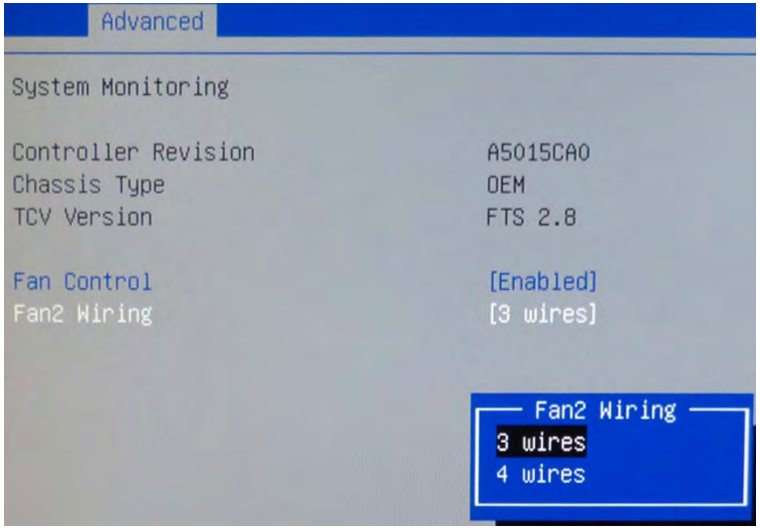
Pin	Signal
1	GND
2	12V in PWM mode / 4V-12V in 3-Pin mode
3	FAN Sense
4	FAN PWM



Note

Fan 1 (Processor) supports 4-wire "PWM" only.

Fan 2 (Chassis) can be used in 4-wire or 3-wire mode (BIOS Setup)



If a 3-wire fan is connected, but BIOS Setup is set to "4 wires" (= Default) the fan will operate at full speed (12V).

In 3-wire mode, the default minimum operating voltage is set to ~ 4V.

Fan current must not exceed 1A per connector.

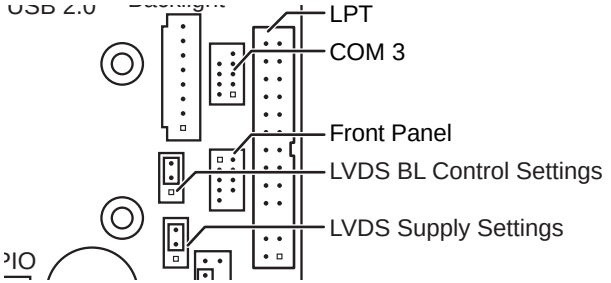
Minimum fan speed can be customized via SilentFanConfig-Manager tool.

Note

TCV Version shows the BIOS internal version of the System Monitoring parameters. After they have been customized by the SilentFanConfig tool, the TCV Version in BIOS Setup is automatically changed to "OEM".

7.13 Front Panel Connector

Pin	Signal	Signal	Pin
10	(KEY)	Reserved (NC)	9
8	PowerSwitch_GND	ResetSwitch_P	7
6	PowerSwitch_P	ResetSwitch_GND	5
4	Power_LED_GND	HDD_LED-	3
2	Power_LED+	HDD_LED+	1



Frontpanel providing

- Powerswitch
- Power/HDD-LED
- Reset-Switch

Note

Pinning is compatible to Intel 10 pin header

Power LED / HDD LED: Constant current, typ. 3mA.

7.14 Additional Jumper Settings

BIOS Recovery Jumper:

- BIOS Recovery/Reset BIOS Setup to Defaults

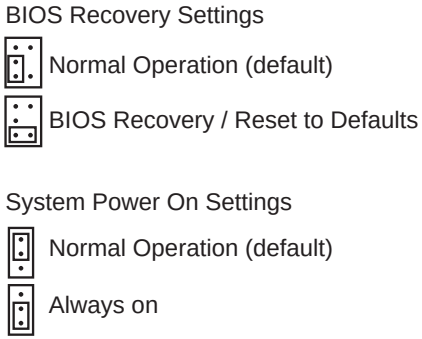
System Power-On Jumper (“ALWON”):

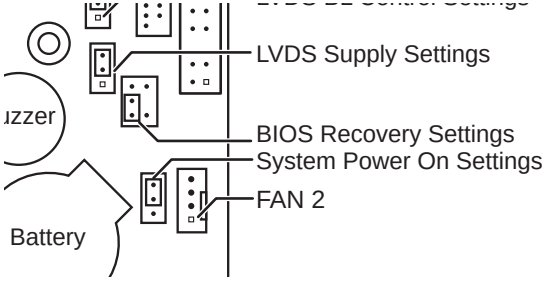
- Forced “Always-Power-On” Setting

System will switch on automatically when connected to power even if the battery is empty or damaged no explicit need for system power button.

Note

Power-on may be delayed for several seconds.





8 System Monitoring

8.1 conga-IGX: Fans

TDPmax - Processor (SoC):

- 9W AMD G-Series SOC GX-210HA
- 15W AMD G-Series SOC GX-217GA
- 25W AMD G-Series SOC GX-420CA

Note

Processor Throttling is enabled @ 108°C and disabled again below 105°C. Above 115°C the processor shuts down the system. The onboard System Monitoring implementation provides a processor Alert above 105°C.

Caution

Fans must NOT be attached or removed while the system is powered, otherwise the conga-IGX may be damaged.

Note

Fan1 PWM (4-wire) only!

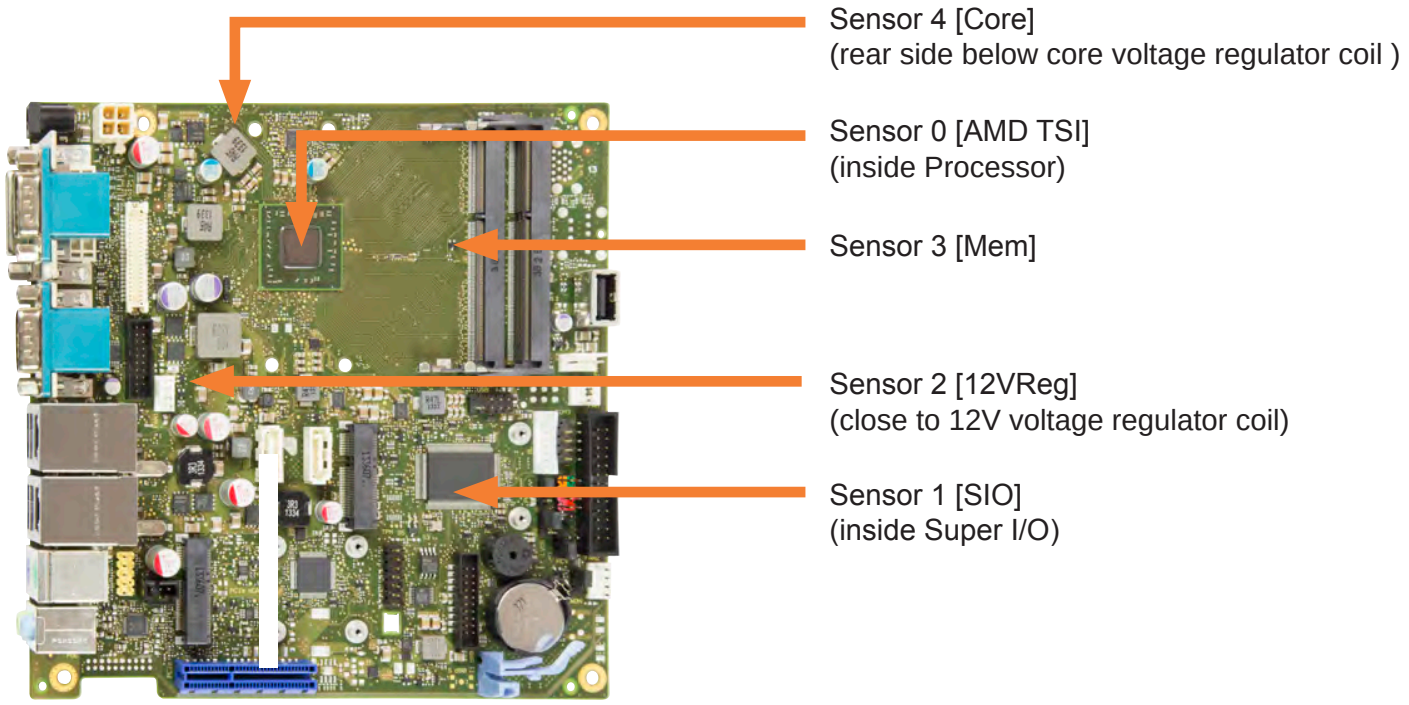
Fan2: PWM (4-wire) or voltage controlled (3-wire) possible.

Selectable via BIOS Setup

Caution

Do not attach more than one fan per connector (max. 1A per connector).

8.2 conga-IGX Sensors



8.3 SilentFanConfigManager

Windows-based System Management Configuration Tool available for download

- Windows-based configuration tool (SilentFanConfig) to create customized system monitoring settings like minimum fan speed and temperature sensor influence. These customized settings are stored in a specific “SMCO” flash file.
- DOS-based tool “SMCO” to flash the customized system monitoring settings (SMCO file) to the system BIOS of the target unit.

Note

New settings are written permanently to system BIOS. Any BIOS update or BIOS Recovery will not reset the new settings

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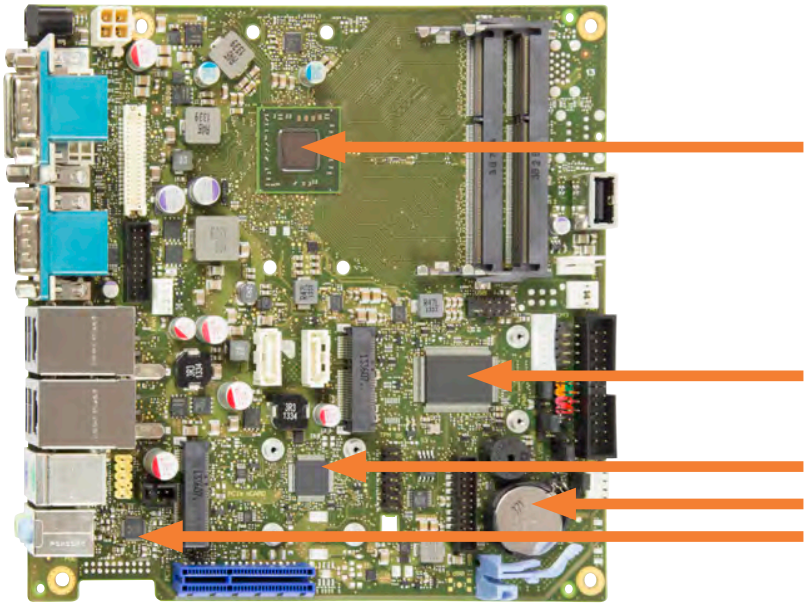
8.4 Temperature Reference Points conga-IGX

Operating Conditions: Circulating air maximum 60°C, Usage 24h/7 days



SoC max. 90°C (chip surface)

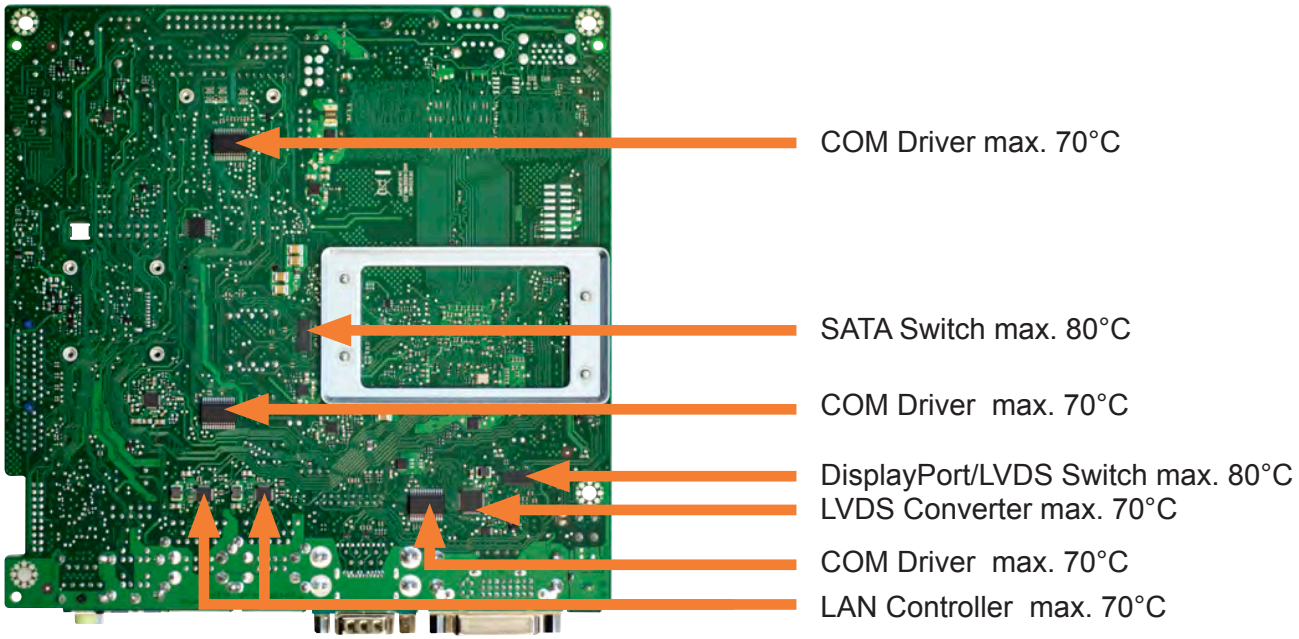
Super I/O (SMSC) max. 70°C

Super I/O (Nuvoton) max. 70°C
Battery max. 60/70°C 1)
Audio Codec max. 70°C

All voltage regulators (FETs) max. 90°C
All capacitor max. 68°C
All inductors max. 90°C
All Oszillators max. 70°C

Note: Battery operation is specified in temperature range up to 60°C. Operation between 60°C and 70°C may result in:

- Higher self discharge rate
- Decline of specified characteristics
- Danger of leakage increases


COM Driver max. 70°C
SATA Switch max. 80°C
COM Driver max. 70°C
DisplayPort/LVDS Switch max. 80°C
LVDS Converter max. 70°C
COM Driver max. 70°C
LAN Controller max. 70°C

9 Power Consumption

9.1 Sample Configuration

Typical mains power consumption:

	Windows 7 - Idle	Windows 7 – 100% Processor Load
conga-IGX1	< 4W (see note below)	~ 13W
conga-IGX2	< 4W (see note below)	~ 20W
conga-IGX3	~ 4W	~ 29W

Note

During fanless operation.

10 Operating System Support

10.1 MS Windows / MS Windows Embedded Compact

MS Windows

- Windows 7 32bit / 64bit
- Windows 8.1 64bit
- SBC conga-IGX is designed according to the Microsoft Guidelines for MS Windows 7 and Windows 8.1
- MS certified drivers are available

MS Windows Embedded CE / Embedded Compact

- AMD plans to support Embedded CE6.0, Embedded Compact 7.0 and Embedded Compact 2013
- Evaluation drivers / SDK

10.2 Linux Support

Following distributions have been tested with “out of box”-drivers:

- Fedora 19
- Debian 7
- Ubuntu LTS 12.04
- OpenSUSE 13.1
- Redhat 6.5
  USB keyboard/mouse issue during installation
  Solved by kernel parameter “iommu=soft”
- Ubuntu Desktop 13.10
  USB keyboard/mouse issue during installation
  Solved by kernel parameter “iommu=soft”
  Graphics issues (X server)
  Workaround: Fallback vesa/fbdev or usage of AMD/ATI graphics driver

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11 conga-IGX Tools

11.1 Common conga-IGX Tools

- BIOS Boot Logo Tool
  Tool to integrate a customized boot logo
- EditCMOS
  DOS-based production tool to change BIOS settings and freeze customized BIOS settings (= customized default settings)
- OEMIDENT
  Production tool to add MS OEM licence data
  (SLP2.x for Windows 7 and OA3 for Windows 8)
  Add an individual customer serial no, add a chassis asset tag, and some more DMI data
- SilentFanConfig-Manager
  Windows-based configuration tool to implement customized fan characteristics and temperature parameters. Includes DOS-based tool "SMCO" to flash the configuration file permanently into the system BIOS.
- Windows System-Monitoring API (BMCAPI)
  BMC-Management-Controller to access and adjust System Monitoring parameters like fan speed and temperatures. This API also provides access to the conga-IGX watchdog, the 8Bit GPIO interface and the intrusion feature of the conga-IGX.
- Linux System-Monitoring Driver ("LM-Sensors")
  BMC-Management-Controller to access and adjust System Monitoring parameters like fan speed and temperatures. This driver also provides access to the conga-IGX watchdog.
- LVDS Tool
  Tool to adjust LVDS-timings for the conga-IGX. Adjusted data are flashed into the system BIOS permanently.
  See section 5.6 of this document for details.

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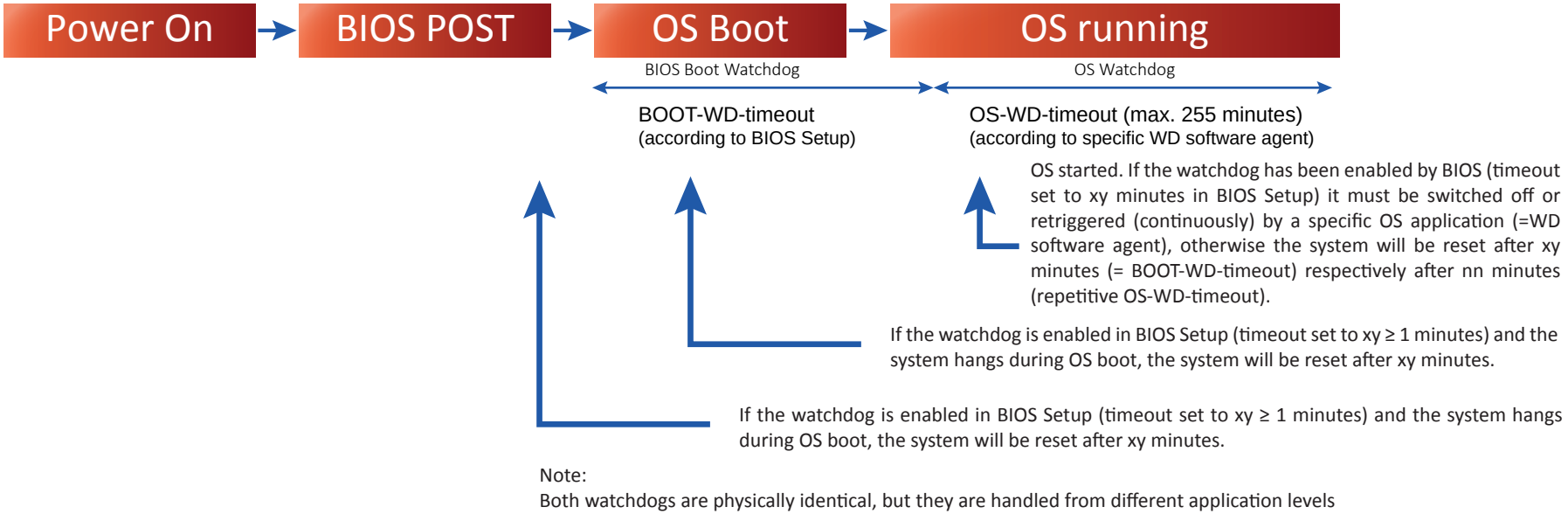
12 Miscellaneous

12.1 System Watchdog (WD)

conga-IGX provides full Operating System Boot- and Operating System-Runtime HW Watchdog supervision.


Power On
BIOS POST
OS Boot
OS running
BIOS Boot Watchdog
OS Watchdog
BOOT-WD-timeout
(according to BIOS Setup)
OS-WD-timeout (max. 255 minutes)
(according to specific WD software agent)
OS started. If the watchdog has been enabled by BIOS (timeout set to xy minutes in BIOS Setup) it must be switched off or retriggered (continuously) by a specific OS application (=WD software agent), otherwise the system will be reset after xy minutes (= BOOT-WD-timeout) respectively after nn minutes (repetitive OS-WD-timeout).
If the watchdog is enabled in BIOS Setup (timeout set to xy ≥ 1 minutes) and the system hangs during OS boot, the system will be reset after xy minutes.
If the watchdog is enabled in BIOS Setup (timeout set to xy ≥ 1 minutes) and the system hangs during OS boot, the system will be reset after xy minutes.

Note:
Both watchdogs are physically identical, but they are handled from different application levels

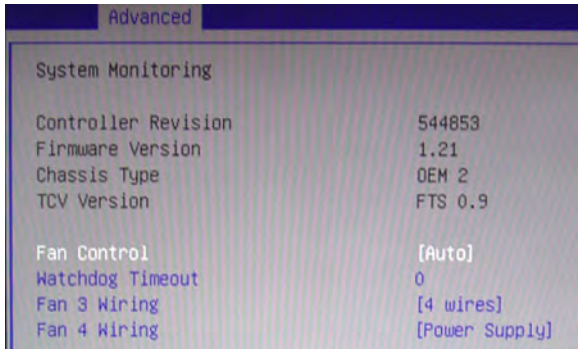
How to handle the two watchdog levels

BIOS Boot Watchdog

Set Watchdog Timeout in BIOS Setup

0 = WD disabled

1 – 255 = WD enabled (timeout = 1 – 255 minutes)



OS Watchdog

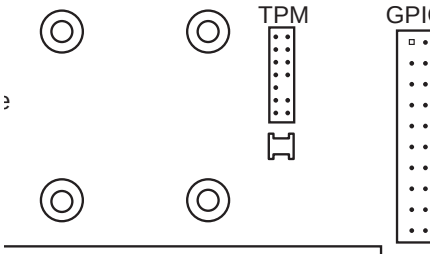
Use “WD software agent” to stop or retrigger the watchdog during OS runtime

Note

This “agent” needs to be provided by the customer, dependent on his/her needs. For easy access to the watchdog functions, the Windows API (BMCAPI) or the related Linux driver (lm-sensors) can be used.

12.2 Trusted Platform Module (TPM)

Optional module based on Infineon TPM V1.2



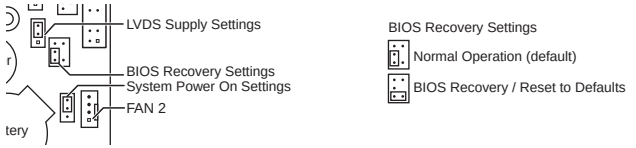
12.3 RealTime Clock (RTC) Accuracy

The onboard realtime clock is approved for an accuracy of +/-35ppm (= maximum 91sec deviation per month).

The RTC crystal itself is specified with +/-20ppm (= max. 52 second deviation per month). Each year of ageing adds around +/-3ppm on top of this.

12.4 BIOS/CMOS Reset (“BIOS Setup Defaults”)

In order to reset the CMOS settings: Power off system, set related Jumper to “BIOS Recovery”, power on system and wait until picture appears on screen. Power off again and set jumper to previous position. BIOS Setup should now be reset to default settings. For this procedure no BIOS update is required!.



13 Known Issues and Important Notes

13.1 Support for MS Windows XP

AMD recently announced to provide drivers for MS Windows XP. They are already available on the AMD developer web.

Note

There will be no official release or support from congatec for these XP drivers.

13.2 Graphics Memory

In BIOS Setup, the graphics memory is set to 256MB (default). If there are 4GB Ram installed Windows 7 (32Bit) provides only 2.69 GB system memory. In order to increase the available system memory, the graphics memory can be reduced to e.g. 128MB in BIOS Setup. In order to increase the graphics performance (e.g. Blueray playback) the graphics memory can be increased to e.g. 512MB in BIOS Setup. Graphics memory should be set to a fixed value.

13.3 AMD “Eyefinity” Support

Currently the AMD graphics driver does not yet provide support for Eyefinity (e.g. combine two displays). Support is expected from June/2014.

13.4 HDMI Audio Support

HDMI audio transmission is not yet supported by the released driver.

An appropriate driver including HDMI support is expected from beginning of June 2014 (Driver version ≥14.20). In order to use HDMI audio in advance, AMD provides a specific DVI-HMDI dongle (OPN: 199-999269).

13.5 Audio: Recording Level via HDA Front Panel

Recording via HDA audio front panel is very quiet. This hardware-related issue will be solved with the upcoming conga-IGX variants.

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13.6 Video Playback (WMV, MP4)

There may be video frame glitches and data drops when running WMV- or MP4 files in 1080p resolution.

Issue seems to be related to used codec version and codec settings. Currently under investigation.

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14 Introduction

BIOS Setup provides settings for system functions and the hardware configuration for the system. Any changes you make to the settings take effect as soon as you save the settings and quit *BIOS Setup*. The individual menus in *BIOS Setup* provide settings for the following areas:

Main:	System functions
Advanced:	Advanced system configuration
Security:	Security functions
Power:	Energy saving functions
Event Logs:	Configuration and display of the event log
Boot:	Configuration of the start-up sequence
Save & Exit:	Save and quit

The setting options depend on the hardware configuration of your system. Some menus and certain settings may therefore not be available in *BIOS Setup* on your system, or the menus may be in a different place, depending on the *BIOS revision*.

14.1 Notational conventions

	Pay particular attention to texts marked with this symbol. Failure to observe this warning endangers your health, destroys the system, or may lead to loss of data. The warranty will be invalidated if the system becomes defective through failure to take notice of this warning.
	Indicates important information which is required to use the system properly.
►	Indicates an activity that must be performed.
	Indicates a result.
`This font`	Indicates data entered using the keyboard in a program dialogue or command line, e.g. your password ((**`Name123`**) or a command used to start a program (**`start.exe`**).
`This font`	Indicates information that is displayed on the screen by a program, e.g.: `Installation is complete!`.

This font	Indicates • terms and texts used in a software interface, e.g.: Click on *Save*. • names of programs or files, e.g. *Windows* or *setup.exe*.
Abc	Indicates a key on the keyboard, e.g: F10.

15 Navigating BIOS Setup

15.1 Open BIOS Setup

► Switch on the system.

Wait until the screen output appears.

► Press function key F2 .

► If the system is password protected, you must now enter the password and confirm with the Enter key. You will find details on password assignment under “Password Description”, section 18.1.

The BIOS Setup Main menu will be displayed on the screen.

► To display system-specific information, select *System Information* and press the Enter key.

The BIOS release information will be displayed:

The revision of the BIOS (e.g. R1.4.0)

Under “Board” you will find the system board number.

15.1.1 If you want to open the Boot Menu immediately

You can use this function if you do not wish to boot your system from the drive which is given as the first setting under *Boot Option Priorities* in the *Boot* menu.

► Start the system and wait until screen output appears.

► Press the function key F12 .

On the screen, the boot options are shown as a popup window. You can now select the drive from which you wish to boot the operating system. The selection options are the same as the possible settings given under *Boot Option Priorities* in the *Boot* submenu.

► Use the ↑ and ↓ cursor keys to select which drive you want to boot the operating system from now and confirm your choice with the Enter key.

i

Your selection is only valid for the current system boot. At the next system boot, the settings in the Boot menu are valid again.

► If you want to start the BIOS Setup, use the cursor keys ↑ or ↓ to select the

Enter Setup entry and confirm your selection with the Enter key.

15.1.2 If you wish to boot immediately from LAN

► Press the function key F11 if you wish to boot directly via LAN and not from the drive which is given as the first position under *Boot Option Priorities* in the *Boot* menu.

15.2 Navigating BIOS Setup

← or → cursor keys	Select menu from menu bar
↑ or ↓ cursor keys	Select field - selected field is highlighted
Enter or ESC keys	Open submenu (marked by ►) Enter and leave ESC
+ or - keys (numeric keypad=	Change entry for field
F2 function key	Set default entries for all menus
F3 function key	Reset entries that were in use when *BIOS Setup* was opened

15.3 Exiting BIOS Setup

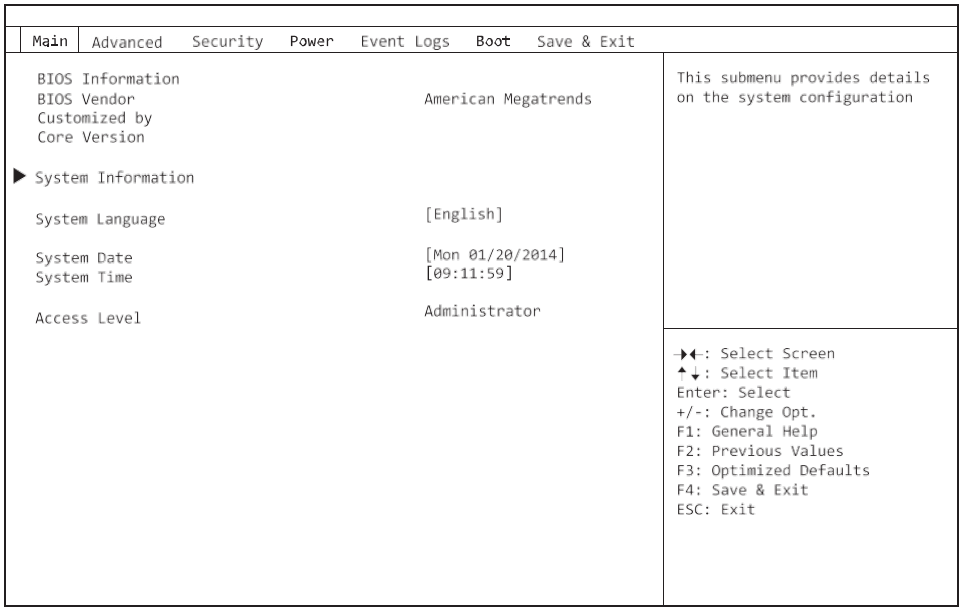
► Select the *Save & Exit* menu from the menu bar to end *BIOS Setup*.

You can then decide whether you want to save the changed settings.

► Select the required option.

► Press the Enter key.

16 Main Menu – System functions



Example showing the *Main* menu

The *Main Menu* is entered, to determine the basic system configuration and to provide an overview. Some of the parameters are only available under certain conditions.

16.1 System Information

This submenu contains descriptions of the system configuration. Some parameters are only available optionally.

16.1.1 Board and Firmware Details

Shows the current information on the installed system board and firmware.

BIOS Revision Shows the current BIOS version.

Build Date and Time Shows the date and time of the formation of the current BIOS.

Board Shows information about the current system board.

Ident Number Shows the identification number of the system.

UUID Shows the 16-byte long Universal Unique ID, also known as the Globally Unique Identifier (GUID).

16.1.2 Network Controller Details

Shows the 6-byte long MAC address (Media Access Control) of the LAN controller.

16.1.3 Processor Details

Processor Type Shows the CPU designation.

CPU / Patch ID Shows the CPU ID and the current Patch ID.

Processor Speed Shows the speed of the processor core.

Cache Counts & Sizes

Active Package, Core & Thread Count (maximum)

Shows detailed information about the cache.

Shows the number of active and maximum available CPU packages, cores and threads.

16.1.4 Memory MemoDetails

Shows details of the memory quantities.

Memory Size / Frequency

Shows the total memory in Megabytes and the memory frequency in MHz.

DIMM n Shows the memory size in Megabytes for the corresponding memory slot.

16.2 System Language

Specifies the language used in the *BIOS Setup*.

16.3 System Date/System Time

Shows the currently set date / the currently set time of the system. The date has the format “Day of the week, month/day/year”. The time has the format “hours/minutes/seconds”.

If you wish to change the currently set date/the currently set time, enter the new date in the field *System Date* and the new time in the field *System Time*. Use the tab key to switch the cursor between the *System Time* and *System Date* fields.

If the system date & time fields are often set incorrectly when starting the computer, the lithium battery is possibly discharged and must be changed.

16.4 Access Level

Shows the current access level in *BIOS Setup*. If the system is not protected by a password, or an administrator password has been allocated, the access level is Administrator. If administrator and user passwords are allocated, the access level depends on the password entered.

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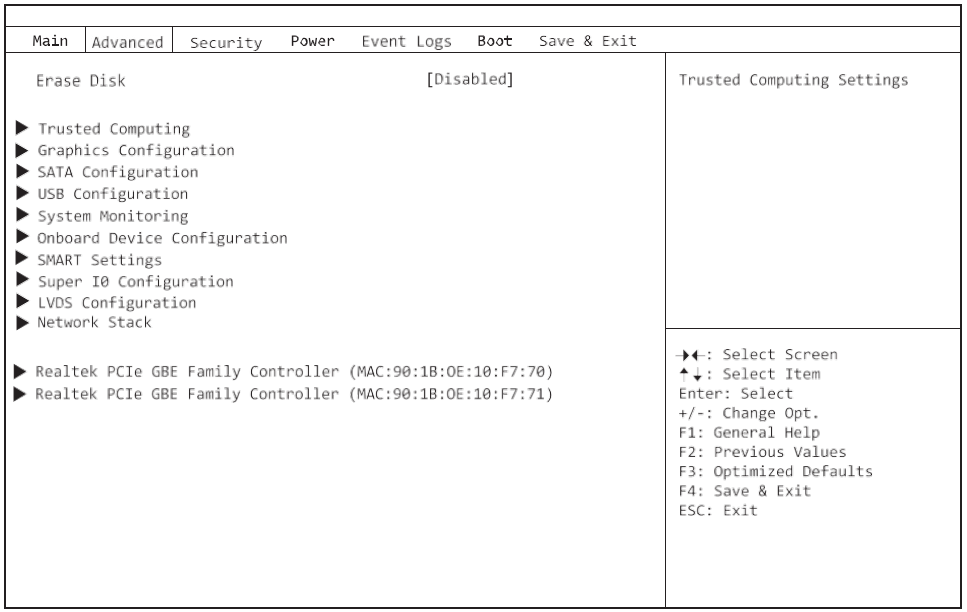
17 Advanced Menu – Advanced system configuration

The advanced functions which are available to the system are configured in this menu for the advanced system configuration.

Only change the default settings if required for a special purpose. Incorrect settings can cause malfunctions.



Example showing the *Advanced* menu

17.1 TPM (Trusted Platform Module) Computing

Opens the submenu for enabling TPM and changing the TPM settings. If this setup menu is available, the system board contains a security and encryption chip (TPM - Trusted Platform Module) which complies with TCG specification 1.2. This chip allows security-related data (passwords, etc.) to be stored securely. The use of TPM is standardized and is specified by the Trusted Computing Group (TCG).

17.1.1 TPM Support

Specifies whether the TPM (Trusted Platform Module) hardware is available. If the TPM is disabled, the system behaves like any other system without TPM hardware.

Disabled	Trusted Platform Module is not available.
Enabled	Trusted Platform Module is available.

17.1.2 TPM State

Specifies whether TPM (Trusted Platform Module) can be used by the operating system.

Disabled	Trusted Platform Module cannot be used.
Enabled	Trusted Platform Module can be used.

17.1.3 Pending TPM operation

Specifies a TPM operation which will be performed during the next boot process.

None	No TPM operation will be performed.
Enable Take Ownership	The operating system can assume ownership of the TPM.
Disable Take Ownership	The operating system cannot assume ownership of the TPM.
TPM Clear	TPM is reset to the factory setting. All keys in the TPM will be deleted.

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17.1.4 Current TPM Status Information

Shows the current TPM (Trusted Platform Module) status.

- *TPM SUPPORT OFF* Is displayed if the *TPM Support* is disabled.
- *TPM Enabled Status* Indicates whether TPM can be used.
- *TPM Active Status* Indicates whether TPM is enabled.
- *TPM Owner Status* Indicates the TPM owner status.

17.2 SATA Configuration

Opens the SATA configuration submenu.

17.2.1 SATA Mode

Specifies in which mode the SATA ports will be operated.

IDE The SATA port is operated in IDE Mode.

AHCI The SATA port is operated in AHCI Mode.

RAID (if available) The SATA port is operated in RAID Mode.

17.2.2 mSATA Support

Determines whether mSATA modules are detected automatically.

Auto If the mSATA module has an mSATA Present Pin, the module is detected automatically.

Enabled The mSATA interface is always active.

17.3 Graphics Configuration

Opens the submenu for configuring the graphics controller on the system board.

17.3.1 Primary Display

Specifies the image source during the Power On Self Test (POST).

Auto — If the display adapter is inserted, this is used as the image source during the POST. Otherwise, the graphics device (IGD) integrated in the system board is used.

IGD — The Integrated Graphics Device (IGD) on the system board serves as the only image source during the POST.

PEG — If the PCI Express display adapter is inserted, this is used as the image source during the POST. Otherwise the IGD is used.

17.3.2 Internal Graphics

Use this option if you wish to use a PCI or PEG card as the primary image source and the graphics controller on the system board (IGD-Integrated Graphics Device) as the secondary image source.

Disabled — If it is not used as the first image source, the IGD is disabled and is not available to the operating system.

Enabled — If the IGD is not used as the primary image source, it can be used for operation with several monitors after the POST.

17.3.3 IGD Memory

Configures the size of the main memory used for the graphics controller on the system board (Integrated Graphics Drive-IGD).

32M...1024M — The set value specifies the size of the shared memory available to the integrated graphics in megabytes.

17.4 LVDS Configuration

Opens the submenu to configure the LVDS interface for direct connection of an LCD panel.

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17.4.1 LVDS Support

Determines whether the LVDS interface is available.

Disabled The LVDS interface is not available.

Enabled The LVDS interface is available.

17.4.2 LVDS Panel Config Select

Determines the resolution of the LVDS (Low Voltage Differential Signalling) interface. The selected resolution should be the same as that of the connected LCD panel.

i

By using the “LVDS” OEM tool, an additional *LVDS adjusted parameters* entry can be created, which enables the use of freely configurable LVDS parameters.

17.4.3 Non-EDID Support

For LCD panels that do not support a DDC (Display Data Channel), no EDID (Extended Display Identification Data) is available.

i

For LCD panels without EDID support, *Enabled* must be set. To install a Linux operating system, it may be necessary to initially select “Non-EDID Support = Disabled”, despite having a connected LVDS panel without DDC support. After the Linux and driver installation is completed, “Non-EDID Support = Enabled” can be set again.

Disabled The LCD provides EDID.

Enabled The LCD does not provide EDID.

17.4.4 LVDS Mode

The selected mode of the LVDS interface must be supported by the LCD panel used.

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Faulty color display often indicates an incorrectly configured LVDS mode.

FPDI 8 bit FPDI (Flat Panel Interface) 8 bit mode is being used.

FPDI 6 bit FPDI (Flat Panel Interface) 6 bit mode is being used.

LDI 8 bit LDI (LVDS Display Interface) 8 bit mode is being used.

LDI 6 bit LDI (LVDS Display Interface) 6 bit mode is being used.

17.4.5 LVDS Channel Swap

Depending on the connected LCD panel, the channels of the LVDS interface can be swapped.

Disabled The channels of the LVDS interface are not swapped.

Enabled The channels of the LVDS interface are swapped.

17.4.6 LVDS Backlight-Enable Polarity

Depending on the connected LCD panel, the polarity for enabling backlighting can be set.

Active High The polarity for enabling backlighting of the LCD panel is Active High.

Active Low The polarity for enabling backlighting of the LCD panel is Active Low.

17.4.7 LVDS Brightness Control

Determines whether the brightness of the LCD panel connected at the LVDS interface is controlled in the BIOS setup or under the operating system.

OS Controlled The brightness of the LCD panel connected at the LVDS interface is controlled under the operating system.

BIOS Controlled The brightness of the LCD panel connected at the LVDS interface is controlled in the BIOS setup.

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17.4.8 LVDS Brightness

Determines the brightness of the LCD panel connected at the LVDS interface. Permissible values: *0..255*

i

0 stands for the minimum (0 V) and 255 for the maximum (4V) brightness voltage level at the corresponding inverter connection.

17.4.9 POST Screen Mode

Determines whether the output during POST is in graphic mode or text mode.

i

To view outputs during POST, text mode must be selected for LCD panels with a resolution < 800x600.

Graphic Mode The system is in graphic mode during POST and BIOS setup.

Text Mode The system is in text mode during POST and BIOS setup.

17.5 USB Configuration

17.5.1 USB Devices

Shows the number of available USB devices, USB keyboards, USB mice and USB hubs.

17.5.2 Legacy USB Support

Specifies whether legacy USB support is available. This function should always be enabled or set to *Auto* so that the operating system can be booted from a USB device if required.

Disabled Legacy USB support is not available. A USB keyboard or USB mouse can only be used if this is supported by the operating system. Booting the operating system from a USB device is not possible.

Enabled Legacy USB support is available. A USB keyboard or USB mouse can also be used if the operating system does not

support USB. Booting the operating system from a USB device is possible.

Auto Legacy USB support will be disabled if no USB devices are connected.

Legacy USB support should be disabled if the operating system supports USB and you do not want to boot the operating system from USB devices.

17.5.3 USB Transfer Time-Out

If USB devices are not detected during the POST, it is possible to increase the waiting time so that slower USB devices can also be detected.

1..5..20 sec Waiting time setting for USB devices in seconds.

17.5.4 Mass Storage Devices

List of USB Mass Storage Device(s)

Allows the user to force a particular device emulation. When set to *Auto*, the devices are emulated according to their media format. Optical drives are emulated as “CD ROM” and drives without data media according to the drive type.

Auto Emulation is chosen depending on the USB device.

Floppy Force USB floppy emulation.

Hard Disk Force USB hard disk emulation.

CD-ROM Force USB CD ROM emulation.

17.6 USB Port Security

Opens the *USB Port Security* submenu in order to configure the USB interfaces present on the conga-IGX.

17.6.1 USB Port Control

Configures the use of the USB ports. Disabled USB ports are only available during the POST, but are no longer available under the operating system.

Enable all ports	All USB ports are enabled.
Enable front and internal ports	All USB ports on the rear of the device are disabled.
Enable rear and internal ports	All USB ports on the front of the device are disabled.
Enable internal ports only	All external USB ports are disabled.

17.6.2 USB Device Control

For the *Enable front and internal ports*, *Enable rear and internal ports* and *Enable used ports* settings, which were made under *USB Port Control*, there are additional options available here.

Enable all devices	Those settings made under *USB Port Control* will be used without any limitation.
Enable Keyboard and Mouse only	Only USB keyboards and USB mice can be operated at the USB ports enabled under *USB Port Control*. Any ports to which no USB keyboards or USB mice are connected are disabled. Keyboards with an integrated hub result in deactivation of the port.
Enable all devices except mass storage devices/Hubs	USB ports on which USB storage devices or USB hubs are connected will be disabled.

17.7 System Monitoring

17.7.1 Controller Revision

Shows the version of the system monitoring controller.

17.7.2 Firmware Version

Shows the firmware version of the system monitoring controller.

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17.7.3 Chassis Type

Displays the current chassis type.

17.7.4 TCV Version

Shows the TCV version (Temperature Characteristics Values).

17.7.5 Fan Control

Specifies whether the fan speed will be adjusted automatically.

Enabled The fan speed is adjusted automatically.

Disabled The fan speed is not adjusted automatically. All fans are operated at maximum speed.

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17.7.6 Fan2 Wiring

Determines whether a three-wire or four-wire fan is connected to fan connector Fan2.

3 wires A three-wire fan is connected.

4 wires A four-wire fan is connected.

17.8 Onboard Device Configuration

Opens the submenu to configure devices on the system board. Some of them are only available under certain conditions.

17.8.1 Audio Configuration

Azalia HD Audio

Allows the onboard Azalia HD (High Definition) audio controller to be enabled.

Disabled The onboard audio controller is disabled.

Enabled The onboard audio controller is enabled.

Front Panel Audio

Makes it possible to use a legacy front audio connector (AC97). The automatic check of whether an audio connection is occupied is not supported with this setting.

High definition For the use of a high definition audio cable with automatic occupancy recognition.

Legacy For the use of a legacy audio cable without automatic occupancy recognition.

17.8.2 High Precision Event Timer Configuration

High Precision Timer

Provided that it is enabled, the operating system is able to make use of the High Precision Event Timer, which allows it to meet the requirements of time-critical applications. The advanced timer is also known as the Multimedia Timer.

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Disabled The High Precision Event Timer is disabled.

Enabled The High Precision Event Timer is enabled.

17.8.3 LAN 1

Specifies whether the LAN 1 controller is available.

Disabled The LAN 1 controller is not available.

Enabled The LAN 1 controller is available.

17.8.4 LAN 2

Specifies whether the LAN 2 controller is available.

Disabled The LAN 2 controller is not available.

Enabled The LAN 2 controller is available.

17.9 Super IO Configuration

17.9.1 Super IO Chip

Shows information about the Super IO Chip.

17.10 Serial Port 0 Configuration

Opens the submenu to configure the serial port 0 (COMA).

17.10.1 Serial Port

Specifies whether the serial port is available.

Disabled The serial port is not available.

Enabled The serial port is available.

17.10.2 Device Settings

Shows the base I/O address and the interrupt used for access to the parallel port.

17.10.3 Change Settings

Specifies which base I/O addresses and which interrupts can be used by the BIOS or operating system for the particular serial port.

Auto	The base I/O address and the interrupt are automatically assigned.
IO=3F8h; IRQ=4;	The base I/O address 3F8h and the interrupt 4 are permanently assigned.
IO=3F8h; IRQ=3,4,5,6,7,9,10,11,12;	The base I/O address is permanently assigned.
IO=2F8h; IRQ=3,4,5,6,7,9,10,11,12;	
IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12;	
IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12;	

The values given in the list are available for the interrupt for automatic selection by the BIOS or the operating system.

i

If conflicts with other devices occur, this option should be converted to *Auto*.

17.11 Serial Port 1 Configuration

Opens the submenu for configuration of the serial port 1 (COMB).

17.11.1 Serial Port

Specifies whether the serial port is available.

Disabled The serial port is not available.

Enabled The serial port is available.

17.11.2 Device Settings

Shows the base I/O address and the interrupt used for access to the parallel port.

17.11.3 Change Settings

Specifies which base I/O addresses and which interrupts can be used by the BIOS or operating system for the particular serial port.

Auto	The base I/O address and the interrupt are automatically assigned.
IO=2F8h; IRQ=3;	The basic I/O address 2F8h and the Interrupt 3 are firmly allocated.
IO=3F8h; IRQ=3,4,5,6,7,9,10,11,12;	The base I/O address is permanently assigned.
IO=2F8h; IRQ=3,4,5,6,7,9,10,11,12;	
IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12;	
IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12;	

The values given in the list are available for the interrupt for automatic selection by the BIOS or the operating system.

i

If conflicts with other devices occur, this option should be converted to *Auto*.

17.12 Parallel Port Configuration

Opens the submenu to configure the parallel port (LPT).

17.12.1 Parallel Port

Specifies whether the parallel port is available.

Disabled The parallel port is not available.

Enabled The parallel port is available.

17.12.2 Device Settings

Shows the base I/O address and the interrupt used for access to the parallel port.

17.12.3 Change Settings

Specifies which base I/O addresses and which interrupts can be used by the BIOS or operating system for the particular serial port.

Auto The base I/O address and the interrupt are automatically assigned.

IO=378h; IRQ=5; The basic I/O address 2F8h and the Interrupt 3 are firmly allocated.

IO=378h; IRQ=5,6,7,9,10,11,12; The base I/O address is permanently assigned.

IO=278h; IRQ=5,6,7,9,10,11,12;

IO=3BCh; IRQ=5,6,7,9,10,11,12;

The values given in the list are available for the interrupt for automatic selection by the BIOS or the operating system.

If conflicts with other devices occur, this option should be converted to *Auto*.

17.12.4 Device Mode

Specifies whether the parallel port should be used as an input/output port or just as an output port. The ECP and EPP transfer modes permit higher transfer speeds of 2 or 2.4 Mbyte/sec. These modes can however only be used on devices that also support these modes. In addition, for EPP the I/O address of the parallel port must be set to 378 h or 278 h.

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Standard Parallel Port Mode	The standard mode will be used for the parallel port.
EPP Mode	Fast transfer mode (up to 2 MByte/sec), data output and data reception are possible. The mode requires a peripheral device which supports the EPP (Enhanced Parallel Port) mode.
ECP Mode	Fast transfer mode (up to 2.4 MByte/sec), data output and data reception are possible. The mode requires a peripheral device which supports the ECP (Extended Capability Port) mode. The necessary DMA channel is determined by the system.
EPP Mode & ECP Mode	Both transfer modes are available.

17.13 Network Stack

Specifies whether the UEFI Network Stack is available for network access under UEFI. If the UEFI Network Stack is disabled, UEFI installation via PXE is not possible, for example.

Disabled	The UEFI Network Stack is not available.
Enabled	The UEFI Network Stack is available.

17.13.1 Ipv4 PXE Support

Specifies whether PXE UEFI Boot via Ipv4 is available for installation of operating systems in UEFI mode.

Disabled	PXE UEFI Boot via Ipv4 is not available.
Enabled	PXE UEFI Boot via Ipv4 is available.

17.13.2 Ipv6 PXE Support

Specifies whether PXE UEFI Boot via Ipv6 is available for installation of operating systems in UEFI mode.

Disabled	PXE UEFI Boot via Ipv6 is not available.
Enabled	PXE UEFI Boot via Ipv6 is available.

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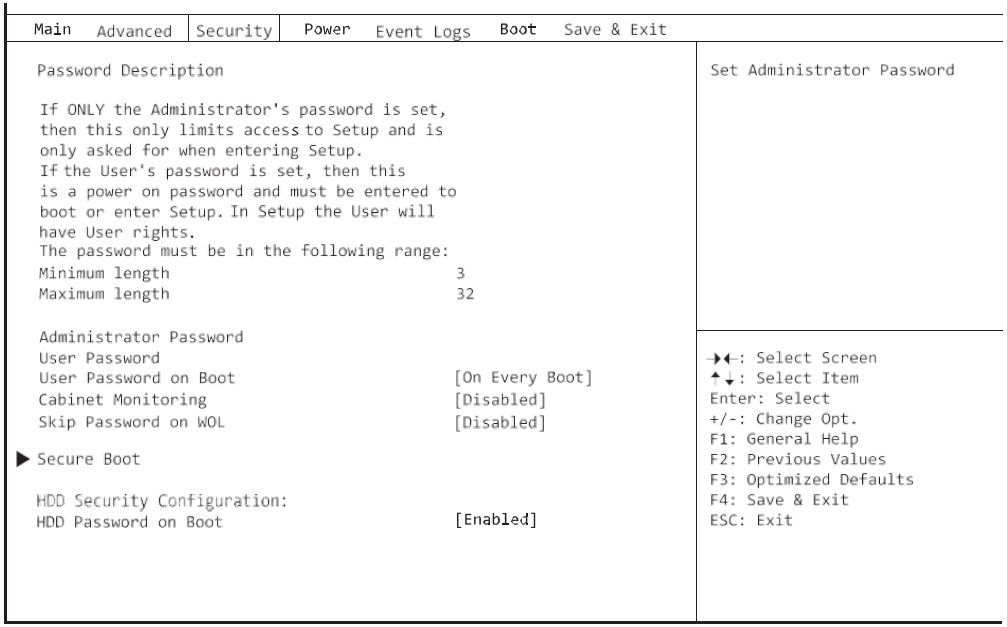
18 Security Menu – Security Functions

The *Security* menu offers various options for protecting your system and personal data from un authorized access. Using a sensible combination of these options will help you achieve maximum protection for your system.

The following security settings can be made in this menu. Some of them are only available under certain conditions.


Main Advanced Security Power Event Logs Boot Save & Exit
Password Description
If ONLY the Administrator's password is set,
then this only limits access to Setup and is
only asked for when entering Setup.
If the User's password is set, then this
is a power on password and must be entered to
boot or enter Setup. In Setup the User will
have User rights.
The password must be in the following range:
Minimum length 3
Maximum length 32
Administrator Password
User Password
User Password on Boot [On Every Boot]
Cabinet Monitoring [Disabled]
Skip Password on WOL [Disabled]
Secure Boot
HDD Security Configuration:
HDD Password on Boot [Enabled]
Set Administrator Password
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit

18.1 Password Description

Neither an Administrator password nor a User password has been allocated.

Opening the BIOS Setup and booting the system are possible without restriction.

Only the Administrator password was allocated.

If ONLY an Administrator password was allocated, only the BIOS Setup is protected. Booting the system can be performed without restriction. When you access the BIOS Setup with an Administrator password, the Administrator access level is assigned to you and you have unrestricted access to the BIOS Setup. If you access the BIOS Setup without a password, access to the BIOS Setup is limited because you are only assigned the User access level.

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Administrator AND user passwords were allocated.

If administrator and user passwords were allocated, the authorisation level in the BIOS Setup depends on the password entered. If you access the BIOS Setup with the administrator password, unlimited access to the BIOS Setup is possible, entry of the user password results in limited access. Booting the system is possible both with the administrator and also with the user password.

i

If the administrator password is deleted, the user password will also be deleted.

The system will stop after an incorrect password has been entered three times. If this happens, switch off the system and then back on again, and enter the correct password.

18.2 Administrator Password

If you press the enter key, a window will open in which you can assign the Administrator password. Enter a character string to define the password. If you confirm an empty password field, the password will be deleted.

i

To call up the complete BIOS Setup, you need the administrator level of access. If an Administrator password is allocated, the user password only allows very limited access to the BIOS Setup.

18.3 User Password

If you press the enter key, a window will open in which you can assign the User password. Enter a character string to define the password. With the User password, you can prevent unauthorized access to your system.

i

In order to be able to assign a User password, an Administrator password must already have been assigned.

18.4 User Password on Boot

Specifies whether a user password must be entered before the boot process.

On Every Boot Entry of a user password is required before every boot process.

Disabled The system starts without requiring the entry of a user password.

If the administrator password and the user password have been assigned and the setting *Disabled* has been chosen for this item, simply press Enter to get USER access to the BIOS Setup. In this case the user password does not have to be entered.

18.5 Cabinet Monitoring

Specifies whether opening of the casing should be monitored.

Disabled The system continues to operate normally even if the casing has been opened.

Enabled If the casing has been opened, then the boot process is suspended until the BIOS Setup is called. If the BIOS Setup is protected with a password, then this must be entered. An SMBIOS event log entry will be generated.

18.6 Skip Password on WOL

Specifies whether a user password will be skipped or must be entered during a system boot via Wake on LAN.

Disabled The user password must be entered via using the keyboard during the system boot.

Enabled The user password is deactivated during the system boot with Wake On LAN.

18.7 FLASH Write

Supplies the system BIOS with write protection.

Disabled The system BIOS cannot be written. A flash BIOS update is not possible

Enabled The system BIOS can be written. A flash BIOS update is possible.

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18.8 Secure Boot

Opens the submenu for configuring Secure Boot.

18.8.1 Platform Mode

Shows whether the system is in user mode or setup mode.

User In user mode, the Platform Key (PK) is installed. Secure Boot can be enabled or disabled via the *Secure Boot Control* menu option.

Setup In setup mode, the Platform Key (PK) is not installed. Secure Boot is disabled and cannot be enabled via the *Secure Boot Control* menu option.

18.8.2 Secure Boot

Indicates whether the Secure Boot function is active.

Disabled Secure Boot is not active.

Enabled Secure Boot is active.

18.8.3 Secure Boot Control

Specifies whether booting of unsigned boot loaders/UEFI OpROMs is permitted.

i

The associated signatures are saved in the BIOS or can be reloaded in the *Key Management* submenu.

Disabled All boot loaders / OpROMs (Legacy / UEFI) can be executed.

Enabled Only booting of signed boot loaders/UEFI OpROMs is permitted.

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18.8.4 Secure Boot Mode

Specifies whether the Key Management submenu is available.

Default The *Key Management* submenu is not available.

Custom The *Key Management* submenu is available.

18.8.5 Key Management

Submenu for deleting, changing and adding the key and signature databases required for Secure Boot.

i

Without the installed Platform Key (PK), the system is in setup mode (Secure Boot is disabled). As soon as the PK is installed, the system switches to user mode (Secure Boot can be enabled).

Factory Default Key Provisioning

If the system is in setup mode (no Public Key is installed), it is possible to install the default Secure Boot key and signature databases.

Disabled The available Secure Boot key and signature databases remain unchanged.

Enabled If the PK, KEK, DB, DBX signature databases are not available, the default Secure Boot key and signature databases will be installed after rebooting the system.

Delete All Secure Boot Variables

Puts the system in setup mode (Secure Boot is disabled). All keys and signature databases (PK, KEK, DB, DBX) in the system are deleted.

Install All Factory Default Keys

All keys and signature databases (PK, KEK, DB, DBX) in the system are reset to the default values. This menu option is only available when the PK is deleted.

Save Secure Boot Keys

Saves the Secure Boot Key and Key Databases to the selected drive.

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Platform Key (PK)

Shows the current status of the Platform Key (PK).

Installed The PK is installed. System is in user mode.

Not Installed The PK is not installed. The system is in setup mode.

Set new PK

Sets the Platform Key (PK). After selecting the drive, the corresponding file must be selected in the browser.

Delete PK

Deletes the Platform Key (PK), which puts the system in setup mode and disables Secure Boot.

Key Exchange Key Database (KEK)

Shows the current status of the Key Exchange Key Database (KEK).

Installed The KEK Database is installed.

Not installed The KEK Database is not installed.

Set new KEK

Sets the Key Exchange Key Database (KEK) After selecting the drive, the corresponding file must be selected in the browser.

Delete KEK

Deletes the Key Exchange Key Database (KEK)

Append Var to KEK

Adds an entry to the Key Exchange Key Database (KEK). After selecting the drive, the corresponding file must be selected in the browser.

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Authorized Signature Database (DB)

Shows the current status of the Authorized Signature Database (DB).

Installed The DB is installed.

Not installed The DB is not installed.

Set new DB

Sets the Authorized Signature Database (DB). After selecting the drive, the corresponding file must be selected in the browser.

Delete DB

Deletes the Authorized Signature Database (DB).

Append Var to DB

Adds an entry to the Authorized Signature Database (DB). After selecting the drive, the corresponding file must be selected in the browser.

Forbidden Signature Database (DBX)

Shows the current status of the Forbidden Signature Database (DB).

Installed The DBX is installed.

Not installed The DBX is not installed.

Set new DBX

Sets the Forbidden Signature Database (DB). After selecting the drive, the corresponding file must be selected in the browser.

Delete DBX

Deletes the Forbidden Signature Database (DB).

Append Var to DBX

Adds an entry to the Forbidden Signature Database (DBX). After selecting the drive, the corresponding file must be selected in the browser.

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18.9 HDD Security Configuration

18.9.1 HDD Password on Boot

Specifies whether a hard disk user password must be entered during every boot process.

Disabled It is not necessary to enter a hard disk user password during the boot process.

Enabled Entry of a hard disk user password is required during every boot process.

18.10 HDD n / HDD-ID

Opens a submenu with information about the hard disk user password.

18.10.1 HDD Password Description

Allows the hard disk user and master passwords to be set, changed and deleted. The hard disk user password must be set up before the Enabled Security setting can be carried out. The hard disk master password can only be changed if you have successfully unlocked it in POST with the hard disk master password.

18.10.2 HDD Password Configuration

Shows the current security status of the hard disk.

18.10.3 Security Supported

Yes is shown here if the device supports use of a hard disk user password. In this case it is possible to assign a password to the hard drive.

18.10.4 Security Enabled

Yes is shown here if either a hard disk user password or a hard disk master password has been assigned to the hard disk.

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18.10.5 Security Locked

The hard disk is locked if it was not unlocked with the valid password.

18.10.6 Security Frozen

If *Yes* is displayed, then a hard disk user password cannot be set up, changed or deleted. To change the security frozen status to *No*, the system must have been shut down before the BIOS Setup is called. Only then can a hard disk user password be set up, changed or deleted.

18.10.7 HDD User Password Status

Shows whether a hard disk user password was allocated or not.

18.10.8 HDD Master Password Status

Shows whether a hard disk master password was allocated or not.

18.10.9 Set User Password

The hard disk user password protects the hard disk(s) from unauthorized access. Booting the operating system from the hard disk or accessing the data on the hard disk can only be carried out by those people who know the hard disk user password. The hard disk user password can be up to 32 characters long. The settings become effective immediately and also remain so, regardless of how you later end the BIOS Setup. The hard disk user password is requested during the POST.

If you press the Enter key, a window will open in which you can assign the hard disk user password. Enter a character string to define the password. If you confirm an empty password field, the password will be deleted.

18.10.10 Set Master Password

If a hard disk user password has been forgotten, it can be deleted using the hard disk master password. This option is only available if an incorrect hard disk user password has been entered three times when the system is booting during POST. The hard disk master password for your hard disk can be obtained from the hard disk vendor but only if the particular HDD-ID is provided together with a valid proof of purchase.

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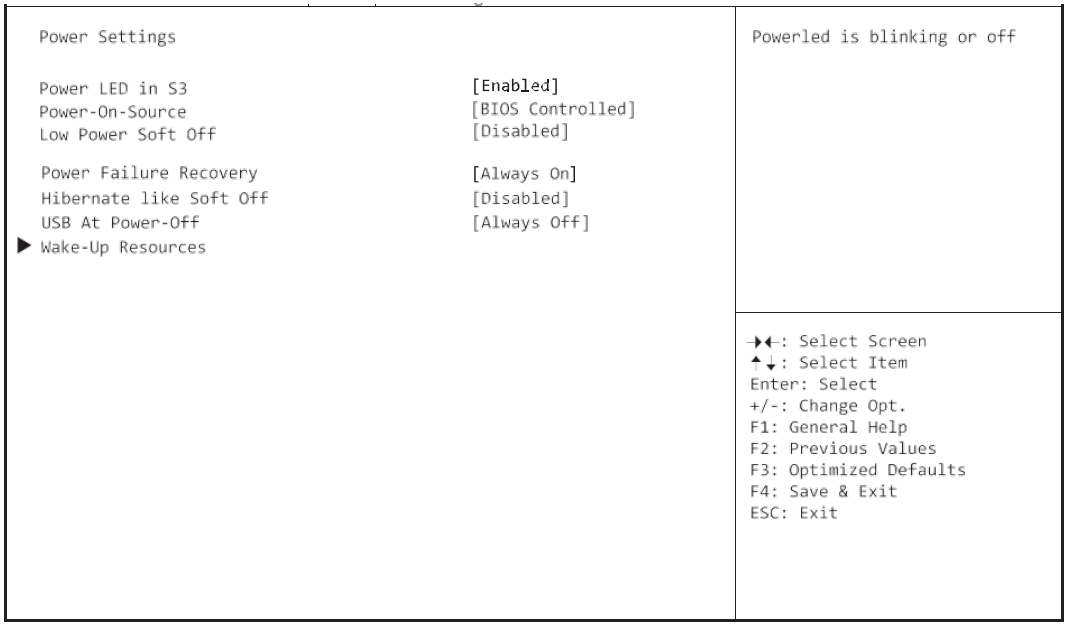
19 Power Menu – Energy saving functions



Example showing the *Power* menu.

19.1 Power Settings

19.1.1 Power LED in S3

Determines the behaviour of the Power LED in standby (S3).

Disabled The Power LED is disabled in standby.

Enabled The Power LED flashes in standby.

19.1.2 Power On Source

Specifies whether the switch-on sources for the system are managed via BIOS or via an ACPI operating system.

BIOS Controlled The switch-on sources are managed via BIOS.

ACPI Controlled The switch-on sources are managed via the ACPI operating system.

19.1.3 Low Power Soft Off

Reduces the energy consumption of a system that is switched off.

When Low Power Soft Off is enabled, the system can only be switched on with the power button on the casing. The device cannot be switched on using the power button of a USB keyboard or a Wake-on-LAN signal.

Disabled Low Power Soft Off is disabled.

Enabled Low Power Soft Off is enabled.

19.1.4 Power Failure Recovery

Specifies how the system behaves during a reboot following a power failure.

Always Off The system switches on briefly, performs a status check (initialisation), and then switches off.

Always On The system switches on.

Previous State The system switches on briefly, performs a status check, and then returns the mode it was in before the power failure occurred (ON or OFF).

Disabled The system does not switch on.

19.1.5 Hibernate like Soft Off

In order to also reduce the energy consumption in hibernate mode (S4), the system will instead be brought into Low Power Soft Off or Zero Watt mode (S5) when it is switched off. However, the energy consumption will only reduce if Low Power Soft Off or Zero Watt mode is enabled.

Disabled The system will be brought into hibernate mode (S4).

Enabled Instead of going into hibernate mode (S4), the system will be brought into Low Power Soft Off or Zero Watt mode (S5).

19.1.6 USB At Power Off

Enables/disables the power supply for the USB ports. This option is only available if Low Power Soft Off and Zero Watt mode are disabled.

Always off The USB ports are no longer supplied with power after the system is shut down.

Always on The USB ports continue to be supplied with power after the system is shut down.

19.2 Wake-Up Resources

This submenu is only available if neither *Zero-Watt mode* nor *Low Power Soft Off* is enabled.

19.2.1 LAN

Determines whether the system can be switched on via a LAN controller (on the system board or expansion card).

Enabled The system can be switched on via a LAN controller.

Disabled The system cannot be switched on via a LAN controller.

19.2.2 Wake On LAN Boot

Specifies the system behavior when switched on by means of network signals.

Boot Sequence — After being switched on via the LAN, the system boots up according to the device sequence specified in the boot menu.

Force LAN Boot — After being switched on via the LAN, the system is booted remotely via the LAN.

19.2.3 Wake Up Timer

The time at which the system should be switched on can be specified here.

Disabled — Wake Up Timer is not enabled.

Enabled — Wake Up Timer is enabled. The system is switched on at the time specified.

19.2.4 Hour

Specifies the hour of the switch-on time.

19.2.5 Minute

Specifies the minute of the switch-on time.

19.2.6 Second

Specifies the second of the switch-on time.

19.2.7 Wake Up Mode

Specifies whether the system should be switched on daily, on selected week days or only once a month at the specified time.

Daily — The system will be switched on daily at the time specified.

Weekly — The system is switched on at the specified time on the selected week days.

Monthly The system will be switched on once a month at the time specified.

19.2.8 Wake Up Day

Specifies the day of the month on which the system is to be switched on. Permitted values are 1..31.

19.2.9 USB Keyboard

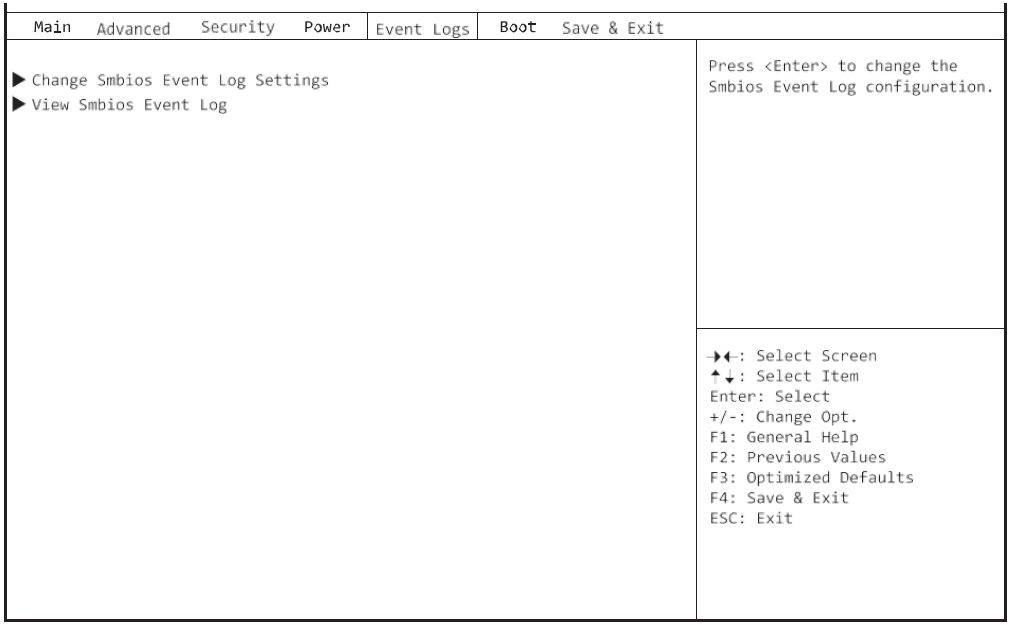
Specifies whether the system can be switched on via the network key of a USB keyboard, if the keyboard supports this function.

Switching on the system via a USB keyboard is only available if *USB At Power-Off* is set to*Always On*.

Disabled The network key of the USB keyboard is disabled.

Enabled The network key of the USB keyboard is enabled.

20 Event Logs – Configuration and Display of the Event Log


Main Advanced Security Power Event Logs Boot Save & Exit
▶ Change Smbios Event Log Settings
▶ View Smbios Event Log
Press <Enter> to change the Smbios Event Log configuration.
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit

Example showing the *Event Logs*.

20.1 Change SMBIOS event log settings

20.1.1 SMBIOS Event Log

Specifies whether the SMBIOS event log is enabled.

Disabled The SMBIOS event log is disabled.

Enabled The SMBIOS event log is enabled.

20.1.2 Erase Event Log

Specifies whether the SMBIOS event log should be deleted.

No	The SMBIOS event log will not be deleted.
Yes, next reset	The SMBIOS event Log is deleted once during the next system boot up. Afterwards, this option is automatically reset to *No*.
Yes, every reset	The SMBIOS event log is deleted every time the system is booted.

20.1.3 When Log is full

Specifies the course of action to be taken when the SMBIOS event log is full.

Do Nothing	When the SMBIOS event log is full, no further entries are added. The SMBIOS event log must first be deleted before new entries can be added.
Erase Immediately	When the SMBIOS event log is full, it will be erased immediately. All existing entries will be deleted!

20.1.4 Log System Boot Event

Specifies whether every boot of the system is logged in the SMBIOS event log.

Disabled	System boots are not recorded in the SMBIOS event log.
Enabled	All system boots are recorded in the SMBIOS event log.

20.1.5 MECI

Multiple Event Count Increment: the number of double events that must occur before the multiple event counter is updated, including the associated log entry. The value is in the range between 1 and 255.

20.1.6 METW

Multiple Event Time Window: the number of minutes that must elapse between double event logs that use a multiple event counter. The value is in the range between 0 to 99 minutes.

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20.1.7 Log OEM Codes

Enables or disables the log function of EFI codes as OEM codes (if not already legacy converted).

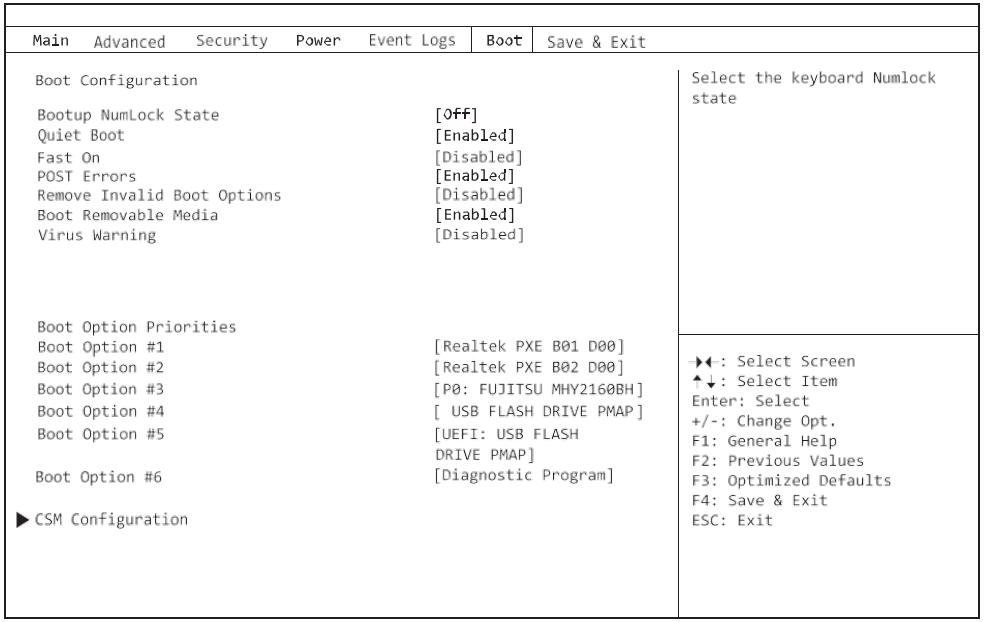
20.1.8 Convert OEM codes

Enabling or disabling the conversion of EFI status codes to standard SMBIOS types (not all may be translated).

20.1.9 View SMBIOS Event Log

Opens the submenu to show all SMBIOS event log entries present.

21 Boot Menu – System boot


Main Advanced Security Power Event Logs Boot Save & Exit
Boot Configuration
Bootup NumLock State [Off]
Quiet Boot [Enabled]
Fast On [Disabled]
POST Errors [Enabled]
Remove Invalid Boot Options [Disabled]
Boot Removable Media [Enabled]
Virus Warning [Disabled]
Boot Option Priorities
Boot Option #1 [Realtek PXE B01 D00]
Boot Option #2 [Realtek PXE B02 D00]
Boot Option #3 [P0: FUJITSU MHY2160BH]
Boot Option #4 [USB FLASH DRIVE PMAP]
Boot Option #5 [UEFI: USB FLASH DRIVE PMAP]
Boot Option #6 [Diagnostic Program]
▶ CSM Configuration
Select the keyboard Numlock state
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit

The sequence of the drives from which booting is to occur can be specified here. Up to eight drives (can include USB ports, for example) can be listed here.

21.1 Boot Configuration

21.1.1 Bootup NumLock State

The setting of the NumLock function after a system boot is provided here. NumLock controls the functionality of the numeric keypad.

On NumLock is enabled, the numeric keypad can be used.

Off NumLock is disabled, the numeric keypad keys can be used to control the cursor.

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The Num indicator light on your keyboard shows the current boot up NumLock state. The Num key on the keyboard can be used to toggle between ON and OFF.

21.1.2 Quiet Boot

The boot logo is shown on the screen instead of the POST boot up information.

Enabled The boot logo is displayed.

Disabled The POST boot up information is shown on the screen.

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21.1.3 Fast On

Fast On is intended to reduce the boot time for systems with a fixed configuration. Once a successful boot path has been established, enabling this function allows this boot path to be used for every subsequent boot process. This reduces the boot time, because only the components needed for booting are initialized. If the system configuration is changed, open the BIOS Setup once only to confirm the new configuration.

Due to the short boot time, it is not usually possible to enter the BIOS Setup by pressing key F2 . To enter the BIOS Setup, power up the system with the on/off switch and keep pressing the on/off switch until you hear a beep. The BIOS Setup then opens.

Note that connected devices (e.g. SSD/HDD type & firmware, etc.) can increase the boot time. To optimise the Fast On function, if possible configure as follows:

- Under First Boot Device, enter the preferred boot medium.
- Disable TPM.
- Disable the SMBIOS Eventlog function.
- Disable parallel and serial ports.

Disabled When the system is switched on, a complete initialization is performed.

Enabled When the system is switched on, initialization is performed only for the components needed for booting.

21.1.4 USB Support

If this function is disabled, USB devices (including USB keyboard) are only available after booting the operating system.

It may not be possible to use setup and operating system boot menus if the function is activated. This function remains without impact if the function for entering a user password is enabled with every boot process.

Disabled USB components are not available before booting the operating system.

Full Initial USB components are available already before booting the operating system.

Partial Initial USB components are not available before booting the operating system.

21.1.5 PS2 Devices Support

It may not be possible to use setup and operating system boot menus if the function is disabled. This function remains without impact if the function for entering a user password is enabled with every boot process.

Disabled PS/2 devices are still not available even after booting the operating system.

Enabled PS/2 devices are available.

21.1.6 POST Errors

Specifies whether the system boot process aborts and the system is stopped when an error is detected.

Disabled The system boot is not aborted. The error will be ignored, as far as this is possible.

Enabled If an error is detected during POST, the boot process is aborted and the system stopped.

21.1.7 Remove Invalid Boot Options

Specifies whether UEFI boot settings for devices that are no longer connected to the system should be removed from the boot options priorities list.

Disabled UEFI boot settings are not removed from the boot options priorities list.

Enabled UEFI boot settings are removed from the boot options priorities list.

21.1.8 Boot Removable Media

Specifies whether booting via a removable data storage device such as a USB stick is supported.

Disabled Booting via a removable data storage device is disabled.

Enabled Booting via a removable data storage device is enabled.

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21.1.9 Virus Warning

Checks the boot sectors of the hard disks for changes since the last system boot. If the boot sectors have been changed without any apparent reason, a suitable virus detection program should be run.

Disabled The boot sectors will not be checked.

Enabled If the boot sector has been changed since the last system boot (e.g. new operating system or a virus attack), a warning notice is displayed. The warning notice remains on the screen until you confirm the changes by going into BIOS Setup and setting this item to *Confirm* or disable the function.

Confirm Confirm a required change to a boot sector (e.g. new operating system).

21.1.10 Prefer USB Boot

Determines whether USB devices should be preferred in the boot sequence.

Enabled USB devices will be preferred to other devices in the boot sequence.

Disabled USB devices will not be treated with preference in the boot sequence.

21.1.11 Boot option priorities

Displays the current boot sequence.

► Use the cursor keys ↑ or ↓ to select the device whose boot sequence you would like to change.

► To increase the priority for the selected device, press the + key. To decrease the priority, press the - key.

► To remove the selected device from the boot sequence, press the Enter key and select *Disabled*.

21.1.12 CSM Configuration

Opens the submenu for configuring the Compatibility Support Module (CSM).

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This submenu is only available if *Secure Boot Control* is disabled under

Setup –> Secure Boot Configuration.

Launch CSM

Specifies whether the Compatibility Support Module (CSM) is executed. A legacy operating system can only be booted if the CSM has been loaded.

Enabled	The CSM is executed so that a legacy or UEFI operating system can be booted.
Disabled	The CSM is not executed so that a only a UEFI operating system can be booted.

Boot Option Filter

Specifies the drives from which booting can be carried out.

UEFI and Legacy	Booting is possible both from drives with UEFI OS and from drives with Legacy OS.
Legacy only	Booting is only possible from drives with Legacy OS.
UEFI only	Booting is only possible from drives with UEFI OS.

Launch PXE OpROM Policy

Specifies which PXE option ROM is booted. For the PXE boot, both the normal (Legacy) PXE boot and a UEFI PXE boot are available.

Do not launch	No option ROMs are booted.
UEFI only	Only UEFI option ROMs are booted.
Legacy only	Only Legacy option ROMs are booted.

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Launch Storage OpROM Policy

Specifies which Storage option ROM is booted.

Do not launch	No Storage option ROMs are booted.
UEFI only	Only UEFI Storage option ROMs are booted.
Legacy only	Only Legacy Storage option ROMs are booted.

Launch Video OpROM Policy

Specifies which Video option ROM is booted.

UEFI only	Only UEFI Video option ROMs are booted.
Legacy only	Only Legacy Video option ROMs are booted.

Other PCI Device ROM Priority

Specifies which option ROM is booted for devices other than the network, mass memory or video.

UEFI OpROM	Only UEFI option ROMs are booted.
Legacy OpROM	Only Legacy option ROMs are booted.

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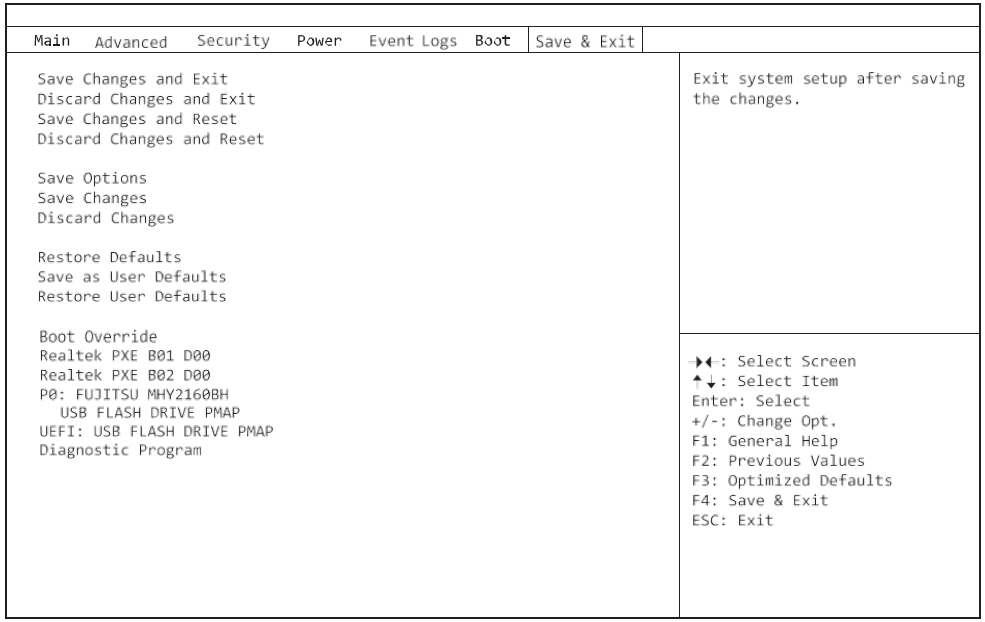
22 Save & Exit Menu – Finish BIOS Setup



The *Exit* menu provides options for saving settings and exiting *BIOS Setup*.

22.1 Save Changes and Exit

To save the current entries in the menus and exit the BIOS Setup, select *Save Changes and Exit* and then *Yes*. The new settings become effective and POST continues, provided a reboot is not necessary due to a changed option.

22.2 Discard Changes and Exit – quit without saving

To discard the changes made since calling up the BIOS Setup or since the last time the function “Save Changes” was called, select *Discard Changes & Exit* and *Yes*. BIOS Setup is terminated and POST continues.

22.3 Save Changes and Reset

To save the current entries in the menus and exit BIOS Setup, select *Save Changes and Reset* and *Yes*. The system reboots and the new settings take effect.

22.4 Discard Changes and Reset

To discard the changes made since calling up the BIOS Setup or since the last time the function “Save Changes” was called, select *Discard Changes and Reset* and *Yes*. BIOS Setup is closed and the system reboots.

22.5 Save Options

22.5.1 Save Changes

To save the changes made so far without leaving BIOS Setup, select *Save Changes* and *Yes*.

22.5.2 Discard Changes

To discard the changes made since calling the BIOS Setup or since the last time the function “Save Changes” was called, but without leaving the BIOS Setup, select *Save Changes* and *Yes*.

22.5.3 Restore Defaults

To reset all the menus of the BIOS setup to the default values, select *Restore Defaults* and *Yes*. If you wish to leave the BIOS Setup with these settings, select *Save Changes and Exit* and *Yes*.

22.5.4 Save as User Defaults

To save the changes made so far as user default settings, select *Save as User Defaults* and *Yes*.

22.5.5 Restore User Defaults

To reset all the menus of the BIOS Setup to the user default settings, select *Restore User Defaults* and

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Yes. If you wish to leave the BIOS Setup with these settings, select *Save Changes and Exit* and *Yes*.

22.6 Boot Override

Use the cursor keys ↑ and ↓ to select the drive from which the operating system should be booted. Press the Enter key to start the boot process from the selected drive.

23 BIOS Update

To carry out a *Flash BIOS Update* you must first download the necessary files from the congatec website.

The BIOS is installed on a flash memory module. If an error occurs during the flash BIOS update procedure, the BIOS image may be destroyed. You can then only recover the BIOS using *BIOS Recovery Update*. If this is not possible, the Flash memory module must be replaced. If this is the case, contact your local congatec sales representative.

24 Appendix: LVDS Reference Cable Pinouts

The following section provides information about reference cable pinouts for commonly used LVDS panels. The information here is provided based on the manufacturer's datasheets.

24.1 AUO_G0121SN01 LVDS Cable Pinout

conga-IGX				AUO- G0121SN01	
LVDS Connector Hirose DF13-40, straight, SMT				LVDS-Connector JAE FI-S20S or compatible	
Signal	**Symbol**	**Pin**		**Pin**	**Symbol**
Ground	GND	1			
Ground	GND	2			
LVDS_Out3+ (ODD_3+)	LO3+	3			
LVDS_Out7+ (EVEN_3+)	LO7+	4			
LVDS_Out3- (ODD_3-)	LO3-	5			
LVDS_Out7- (EVEN_3-)	LO7-	6			
Ground	GND	7	◄·····►	3	GND
Ground	GND	8	◄·····►	4	GND
LVDS_Out2+ (ODD_2+)	LO2+	9	◄·····►	12	RxIN2+
LVDS_Out6+ (EVEN_2+)	LO6+	10			
LVDS_Out2- (ODD_2-)	LO2-	11	◄·····►	11	RxIN2-
LVDS_Out6- (EVEN_2-)	LO6-	12			
Ground	GND	13			
Ground	GND	14	◄·····►	7	GND
LVDS_Out1+ (ODD_1+)	LO1+	15	◄·····►	9	RxIN1+
LVDS_Out5+ (EVEN_1+)	LO5+	16			
LVDS_Out1- (ODD_1-)	LO1-	17	◄·····►	8	RxIN1-
LVDS_Out5- (EVEN_1-)	LO5-	18			
Ground	GND	19			
Ground	GND	20	◄·····►	10	GND
LVDS_Out0+ (ODD_0+)	LO0+	21	◄·····►	6	RxIN0+
LVDS_Out4+ (EVEN_0+)	LO4+	22			
LVDS_Out0- (ODD_0-)	LO0-	23	◄·····►	5	RxIN0-
LVDS_Out4- (EVEN_0-)	LO4-	24			
Ground	GND	25			
Ground	GND	26	◄·····►	13	GND
LVDS_CLK1+ (CLK_ODD+)	CLK1+	27	◄·····►	15	CKIN+
LVDS_CLK2+ (CLK_EVEN+)	CLK2+	28			
LVDS_CLK1- (CLK_ODD-)	CLK1-	29	◄·····►	14	CKIN-
LVDS_CLK2- (CLK_EVEN-)	CLK2-	30			
Ground	GND	31	◄·····►	16	GND
Ground	GND	32			
DDC-Clock	DDCCLK	33			
DDC-Data	DDCDATA	34			
LCD-Power 1)	+3.3V / +5V	35	◄·····►	1	VDD
LCD-Power 1)	+3.3V / +5V	36	◄·····►	2	VDD
LCD-Power 1)	+3.3V / +5V	37			
Ground	GND	38			
Ground	GND	39			
LCD_PowerOn	LCD_On	40			

24.1.1 Panel Pinout AUO G0121SN01

Pin	Signal Name	Pin	Signal Name
1	VDD	2	VDD
3	GND	4	GND
5	RxIN0-	6	RxIN0+
7	GND	8	RxIN1-
9	RxIN1+	10	GND
11	RxIN2-	12	RxIN2+
13	GND	14	CKIN-
15	CKIN+	16	GND
17	NC/GND	18	NC/GND
19 (Note1)	NC/GND	20	NC/GND
Note1: Pin19 can be used for plugging “reverse scan” function.			

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24.1.2 Inverter Cable Plan

conga-IGX				Green C&C GH093A	
Inverter-Connector JST PHR-8				20037WR-06A00(P) (YEONHO) / EQUIVALENT	
Signal	**Symbol**	**Pin**		**Pin**	**Symbol**
Ground	GND	1	◄·····►	3	GND
Ground	GND	2	◄·····►	4	GND
Backlight Brightness CTRL	tbd	3	◄·····►	6	BRT_Adj
Power 5V	VCC	4			
Power 5V	VCC	5			
Backlight On/Off Control	BL On/Off	6	◄·····►	5	BL On/Off
Power 12V	+12V	7	◄·····►	1	DC-In / 12V
Power 12V	+12V	8	◄·····►	2	DC-In / 12V

24.1.3 Inverter Pinout Green C&C GH093A

Signal	Symbol	Remark
1,2	DC-IN(Vin)	DC INPUT Power (12V)
3,4	GND	GND
5	BL ON/OFF	CCFL Drive SIGNAL(Active HIGHT)
6	BRT_ADJ	0 ~ 5V

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24.2 AUO_G150XG01 LVDS Cable Pinout

conga-IGX				AUO-G150XG01	
LVDS Connector Hirose DF13-40, straight, SMT				DF-14H-20P-1.25H (Hirose) or CWY20G-A0D1T (PTWO)	
Signal	**Symbol**	**Pin**		**Pin**	**Symbol**
Ground	GND	1			
Ground	GND	2	◄·····►	20	GND
LVDS_Out3+ (ODD_3+)	LO3+	3	◄·····►	18	RxIN3+
LVDS_Out7+ (EVEN_3+)	LO7+	4			
LVDS_Out3- (ODD_3-)	LO3-	5	◄·····►	17	RxIN3-
LVDS_Out7- (EVEN_3-)	LO7-	6			
Ground	GND	7	◄·····►	3	GND
Ground	GND	8	◄·····►	4	GND
LVDS_Out2+ (ODD_2+)	LO2+	9	◄·····►	12	RxIN2+
LVDS_Out6+ (EVEN_2+)	LO6+	10			
LVDS_Out2- (ODD_2-)	LO2-	11	◄·····►	11	RxIN2-
LVDS_Out6- (EVEN_2-)	LO6-	12			
Ground	GND	13			
Ground	GND	14	◄·····►	7	GND
LVDS_Out1+ (ODD_1+)	LO1+	15	◄·····►	9	RxIN1+
LVDS_Out5+ (EVEN_1+)	LO5+	16			
LVDS_Out1- (ODD_1-)	LO1-	17	◄·····►	8	RxIN1-
LVDS_Out5- (EVEN_1-)	LO5-	18			
Ground	GND	19			
Ground	GND	20	◄·····►	10	GND
LVDS_Out0+ (ODD_0+)	LO0+	21	◄·····►	6	RxIN0+
LVDS_Out4+ (EVEN_0+)	LO4+	22			
LVDS_Out0- (ODD_0-)	LO0-	23	◄·····►	5	RxIN0-
LVDS_Out4- (EVEN_0-)	LO4-	24			
Ground	GND	25			
Ground	GND	26	◄·····►	13	GND
LVDS_CLK1+ (CLK_ODD+)	CLK1+	27	◄·····►	15	CKIN+
LVDS_CLK2+ (CLK_EVEN+)	CLK2+	28			
LVDS_CLK1- (CLK_ODD-)	CLK1-	29	◄·····►	14	CKIN-
LVDS_CLK2- (CLK_EVEN-)	CLK2-	30			
Ground	GND	31	◄·····►	16	GND
Ground	GND	32	◄·····►	19	GND
DDC-Clock	DDCCLK	33			
DDC-Data	DDCDATA	34			
LCD-Power 1)	+3.3V / +5V	35	◄·····►	1	VDD
LCD-Power 1)	+3.3V / +5V	36	◄·····►	2	VDD
LCD-Power 1)	+3.3V / +5V	37			
Ground	GND	38			
Ground	GND	39			
LCD_PowerOn	LCD_On	40			
1) selectable via Jumper					

24.2.1 Panel Pinout AUO G150XG01

Pin	Signal Name	Description
1	VDD	Power Supply, 3.3V (typical)
2	VDD	Power Supply, 3.3V (typical)
3	GND	Ground
4	REV	Reverse Scan [H: Enable; L/NC: Disable]*Note1,3
5	Rin0-	- LVDS differential data input
6	Rin0+	+ LVDS differential data input
7	GND	Ground
8	Rin1-	- LVDS differential data input
9	Rin1+	+ LVDS differential data input
10	GND	Ground
11	Rin2-	- LVDS differential data input
12	Rin2+	+ LVDS differential data input
13	GND	Ground
14	ClkIN-	- LVDS differential clock input
15	ClkIN+	+ LVDS differential clock input
16	GND	Ground
17	Rin3-	- LVDS differential data input *Note2
18	Rin3+	+ LVDS differential data input *Note2
19	NC/GND	Reserved for AUO internal test. Please set it as NC or Ground.
20	SEL68	Selection for 6 bits/8bits LVDS data input[H/NC: 6bits, L: 8bits]*Note1,3
Note 1: Input signals shall be in low status when VDD is off.		
Note 2: For 6bits input mode, pin 17 and pin 18 must be floated.		
Note 3: High stands for “3.3V”, Low stands for “0V”, NC stands for “No Connection”.		

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24.2.2 Inverter Cable Plan

conga-IGX				Green C&C GH001A	
Inverter-Connector JST PHR-8				12505WR-10A00(P) (YEONHO) / EQUIVALENT	
SIGNAL	SYMBOL	Pin No.		Pin No.	Symbol
Ground	GND	1	◄·····►	3	GND
Ground	GND	2	◄·····►	4	GND
Backlight Brightness CTRL	tbd	3	◄·····►	1	BRT_Adj
Power 5V	VCC	4			
Power 5V	VCC	5			
Backlight On/Off Control	BL On/Off	6	◄·····►	5	BL On/Off
Power 12V	+12V	7	◄·····►	9	DC-In / 12V
Power 12V	+12V	8	◄·····►	10	DC-In / 12V

24.2.3 Inverter Pinout Green C&C GH001A

Pin	Symbol	Remark
1	BRT_ADJ	0 ~ 5V
3,4,7,8	GND	GND
5	BL ON/OFF	CCFL Drive SIGNAL(Active HIGHT)
2,6	N.C	
9,10	DC-IN(Vin)	DC INPUT Power (12V)

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24.3 AUO-M170EG01-VD LVDS Cable Pinout

conga-IGX				AUO-M170EG01-VD	
LVDS Connector Hirose DF13-40, straight, SMT				JAE FI-XB30SSL-HF15 or compatible	
Signal	**Symbol**	**Pin**		**Pin**	**Symbol**
Ground	GND	1			
Ground	GND	2	◄·····►	7	GND
LVDS_Out3+ (ODD_3+)	LO3+	3	◄·····►	11	RxOIN3+
LVDS_Out7+ (EVEN_3+)	LO7+	4	◄·····►	23	RxEIN3+
LVDS_Out3- (ODD_3-)	LO3-	5	◄·····►	10	RxOIN3-
LVDS_Out7- (EVEN_3-)	LO7-	6	◄·····►	22	RxEIN3-
Ground	GND	7			
Ground	GND	8	◄·····►	14	GND
LVDS_Out2+ (ODD_2+)	LO2+	9	◄·····►	6	RxOIN2+
LVDS_Out6+ (EVEN_2+)	LO6+	10	◄·····►	19	RxEIN2+
LVDS_Out2- (ODD_2-)	LO2-	11	◄·····►	5	RxOIN2-
LVDS_Out6- (EVEN_2-)	LO6-	12	◄·····►	18	RxEIN2-
Ground	GND	13			
Ground	GND	14	◄·····►	17	GND
LVDS_Out1+ (ODD_1+)	LO1+	15	◄·····►	4	RxOIN1+
LVDS_Out5+ (EVEN_1+)	LO5+	16	◄·····►	16	RxEIN1+
LVDS_Out1- (ODD_1-)	LO1-	17	◄·····►	3	RxOIN1-
LVDS_Out5- (EVEN_1-)	LO5-	18	◄·····►	15	RxEIN1-
Ground	GND	19			
Ground	GND	20	◄·····►	24	GND
LVDS_Out0+ (ODD_0+)	LO0+	21	◄·····►	2	RxOIN0+
LVDS_Out4+ (EVEN_0+)	LO4+	22	◄·····►	13	RxEIN0+
LVDS_Out0- (ODD_0-)	LO0-	23	◄·····►	1	RxOIN0-
LVDS_Out4- (EVEN_0-)	LO4-	24	◄·····►	12	RxEIN0-
Ground	GND	25			
Ground	GND	26			
LVDS_CLK1+ (CLK_ODD+)	CLK1+	27	◄·····►	9	RxOCLKIN+
LVDS_CLK2+ (CLK_EVEN+)	CLK2+	28	◄·····►	21	RxECLKIN+
LVDS_CLK1- (CLK_ODD-)	CLK1-	29	◄·····►	8	RxOCLKIN-
LVDS_CLK2- (CLK_EVEN-)	CLK2-	30	◄·····►	20	RxECLKIN-
Ground	GND	31			
Ground	GND	32			
DDC-Clock	DDCCLK	33			
DDC-Data	DDCDATA	34			
LCD-Power 1)	+3.3V / +5V	35	◄·····►	28	VCC
LCD-Power 1)	+3.3V / +5V	36	◄·····►	29	VCC
LCD-Power 1)	+3.3V / +5V	37	◄·····►	30	VCC
Ground	GND	38			
Ground	GND	39			
LCD_PowerOn	LCD_On	40			
1) selectable via Jumper					

24.3.1 Panel Pinout AUO M170EG01-VD

Pin	Signal Name	Description
1	RxO0-	Negative LVDS differential data input (Odd data)
2	RxO0+	Positive LVDS differential data input (Odd data)
3	RxO1-	Negative LVDS differential data input (Odd data)
4	RxO1+	Positive LVDS differential data input (Odd data)
5	RxO2-	Negative LVDS differential data input (Odd data, H -Sync,V-Sync,DSPTMG)
6	RxO2+	Positive LVDS differential data input (Odd data, H -Sync,V-Sync,DSPTMG)
7	GND	Power Ground
8	RxOC-	Negative LVDS differential clock input (Odd clock)
9	RxOC+	Positive LVDS differential clock input (Odd clock)
10	RxO3-	Negative LVDS differential data input (Odd data)
11	RxO3+	Positive LVDS differential data input (Odd data)
12	RxE0-	Negative LVDS differential data input (Even clock)
13	RxE0+	Positive LVDS differential data input (Even data)
14	GND	Power Ground
15	RxE1-	Positive LVDS differential data input (Even data)
16	RxE1+	Negative LVDS differential data input (Even data)
17	GND	Power Ground
18	RxE2-	Negative LVDS differential data input (Even data)
19	RxE2+	Positive LVDS differential data input (Even data)
20	RxEC-	Negative LVDS differential clock input (Even clock)
21	RxEC+	Positive LVDS differential clock input (Even clock)
22	RxE3-	Negative LVDS differential data input (Even data)
23	RxE3+	Positive LVDS differential data in put (Even data)
24	GND	Power Ground
25	GND	Power Ground
26	NC	No contact (For AUO test only)
27	GND	Power Ground
28	VCC	+5.0V Power Supply
29	VCC	+5.0V Power Supply
30	VCC	+5.0V Power Supply

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24.3.2 Inverter Cable Plan

conga-IGX				Green C&C GH053A	
Inverter-Connector JST PHR-8				53261-1290 (Molex) or equivalent	
Signal	**Symbol**	**Pin**		**Pin**	**Symbol**
Ground	GND	1	◄·····►	7 (6)	GND
Ground	GND	2	◄·····►	5 (8)	GND
Backlight Brightness CTRL	tbd	3	◄·····►	11 (2)	BRT_Adj
Power 5V	VCC	4			
Power 5V	VCC	5			
Backlight On/Off Control	BL On/Off	6	◄·····►	9 (4)	BL On/Off
Power 12V	+12V	7	◄·····►	3 (10)	DC-In / 12V
Power 12V	+12V	8	◄·····►	1 (12)	DC-In / 12V
				Pinout analog connector CN1 (mirrored to inverter spec, inverter pinout in brackets)	

24.3.3 Inverter Pinout Green C&C GH053A

Pin	Symbol	Remark
2	BRT_ADJ	0 ~ 5V
1,3,5,6,8,9	GND	GND
4	BL ON/OFF	CCFL Drive SIGNAL(Active HIGHT)
7	N.C	
10,11,12	DC-IN(Vin)	DC INPUT Power (12V)
Note: Mirrored Pinout		

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24.4 AUO-M190EG01 V0 LVDS Cable Pinout

conga-IGX				AUO-M190EG01 V0	
LVDS Connector Hirose DF13-40, straight, SMT				JAE FI-XB30SSL-HF15 or compatible	
Signal	**Symbol**	**Pin**		**Pin**	**Symbol**
Ground	GND	1			
Ground	GND	2	◄·····►	7	GND
LVDS_Out3+ (ODD_3+)	LO3+	3	◄·····►	11	RxOIN3+
LVDS_Out7+ (EVEN_3+)	LO7+	4	◄·····►	23	RxEIN3+
LVDS_Out3- (ODD_3-)	LO3-	5	◄·····►	10	RxOIN3-
LVDS_Out7- (EVEN_3-)	LO7-	6	◄·····►	22	RxEIN3-
Ground	GND	7			
Ground	GND	8	◄·····►	14	GND
LVDS_Out2+ (ODD_2+)	LO2+	9	◄·····►	6	RxOIN2+
LVDS_Out6+ (EVEN_2+)	LO6+	10	◄·····►	19	RxEIN2+
LVDS_Out2- (ODD_2-)	LO2-	11	◄·····►	5	RxOIN2-
LVDS_Out6- (EVEN_2-)	LO6-	12	◄·····►	18	RxEIN2-
Ground	GND	13			
Ground	GND	14	◄·····►	17	GND
LVDS_Out1+ (ODD_1+)	LO1+	15	◄·····►	4	RxOIN1+
LVDS_Out5+ (EVEN_1+)	LO5+	16	◄·····►	16	RxEIN1+
LVDS_Out1- (ODD_1-)	LO1-	17	◄·····►	3	RxOIN1-
LVDS_Out5- (EVEN_1-)	LO5-	18	◄·····►	15	RxEIN1-
Ground	GND	19			
Ground	GND	20	◄·····►	24	GND
LVDS_Out0+ (ODD_0+)	LO0+	21	◄·····►	2	RxOIN0+
LVDS_Out4+ (EVEN_0+)	LO4+	22	◄·····►	13	RxEIN0+
LVDS_Out0- (ODD_0-)	LO0-	23	◄·····►	1	RxOIN0-
LVDS_Out4- (EVEN_0-)	LO4-	24	◄·····►	12	RxEIN0-
Ground	GND	25			
Ground	GND	26			
LVDS_CLK1+ (CLK_ODD+)	CLK1+	27	◄·····►	9	RxOCLKIN+
LVDS_CLK2+ (CLK_EVEN+)	CLK2+	28	◄·····►	21	RxECLKIN+
LVDS_CLK1- (CLK_ODD-)	CLK1-	29	◄·····►	8	RxOCLKIN-
LVDS_CLK2- (CLK_EVEN-)	CLK2-	30	◄·····►	20	RxECLKIN-
Ground	GND	31			
Ground	GND	32			
DDC-Clock	DDCCLK	33			
DDC-Data	DDCDATA	34			
LCD-Power 1)	+3.3V / +5V	35	◄·····►	28	VCC
LCD-Power 1)	+3.3V / +5V	36	◄·····►	29	VCC
LCD-Power 1)	+3.3V / +5V	37	◄·····►	30	VCC
Ground	GND	38			
Ground	GND	39			
LCD_PowerOn	LCD_On	40			
1) selectable via Jumper					

24.4.1 Panel Pinout AUO-M190EG01 V0

Pin	Signal Name	Description
1	RxO0-	Negative LVDS differential data input (Odd data)
2	RxO0+	Positive LVDS differential data input (Odd data)
3	RxO1-	Negative LVDS differential data input (Odd data)
4	RxO1+	Positive LVDS differential data input (Odd data)
5	RxO2-	Negative LVDS differential data input (Odd data, H -Sync,V-Sync,DSPTMG)
6	RxO2+	Positive LVDS differential data input (Odd data, H -Sync,V-Sync,DSPTMG)
7	GND	Power Ground
8	RxOC-	Negative LVDS differential clock input (Odd clock)
9	RxOC+	Positive LVDS differential clock input (Odd clock)
10	RxO3-	Negative LVDS differential data input (Odd data)
11	RxO3+	Positive LVDS differential data input (Odd data)
12	RxE0-	Negative LVDS differential data input (Even clock)
13	RxE0+	Positive LVDS differential data input (Even data)
14	GND	Power Ground
15	RxE1-	Positive LVDS differential data input (Even data)
16	RxE1+	Negative LVDS differential data input (Even data)
17	GND	Power Ground
18	RxE2-	Negative LVDS differential data input (Even data)
19	RxE2+	Positive LVDS differential data input (Even data)
20	RxEC-	Negative LVDS differential clock input (Even clock)
21	RxEC+	Positive LVDS differential clock input (Even clock)
22	RxE3-	Negative LVDS differential data input (Even data)
23	RxE3+	Positive LVDS differential data in put (Even data)
24	GND	Power Ground
25	GND	Power Ground
26	NC	No contact (For AUO test only)
27	GND	Power Ground
28	VCC	+5.0V Power Supply
29	VCC	+5.0V Power Supply
30	VCC	+5.0V Power Supply

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24.4.2 Inverter Cable Plan

conga-IGX				Green C&C GH053A	
Inverter-Connector JST PHR-8				53261-1290 (Molex) or equivalent	
Signal	**Symbol**	**Pin**		**Pin**	**Symbol**
Ground	GND	1	◄·····►	7 (6)	GND
Ground	GND	2	◄·····►	5 (8)	GND
Backlight Brightness CTRL	tbd	3	◄·····►	11 (2)	BRT_Adj
Power 5V	VCC	4			
Power 5V	VCC	5			
Backlight On/Off Control	BL On/Off	6	◄·····►	9 (4)	BL On/Off
Power 12V	+12V	7	◄·····►	3 (10)	DC-In / 12V
Power 12V	+12V	8	◄·····►	1 (12)	DC-In / 12V
				Pinout analog connector CN1 (mirrored to inverter spec, inverter pinout in brackets)	

24.4.3 Inverter Pinout Green C&C GH053A

Pin	Symbol	Remark
2	BRT_ADJ	0 ~ 5V
1,3,5,6,8,9	GND	GND
4	BL ON/OFF	CCFL Drive SIGNAL(Active HIGHT)
7	N.C	
10,11,12	DC-IN(Vin)	DC INPUT Power (12V)
Note: Mirrored Pinout		

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24.5 Sharp LQ190 LVDS Cable Pinout

conga-IGX				Sharp LQ190	
LVDS Connector Hirose DF13-40, straight, SMT				FI-X30SSL-HF (Japan Aviation Electronics)	
Signal	**Symbol**	**Pin**		**Pin**	**Symbol**
Ground	GND	1			
Ground	GND	2			
LVDS_Out3+ (ODD_3+)	LO3+	3	◄·····►	11	RxO3+
LVDS_Out7+ (EVEN_3+)	LO7+	4	◄·····►	23	RxE3+
LVDS_Out3- (ODD_3-)	LO3-	5	◄·····►	10	RxO3-
LVDS_Out7- (EVEN_3-)	LO7-	6	◄·····►	22	RxE3-
Ground	GND	7	◄·····►	7	GND
Ground	GND	8			
LVDS_Out2+ (ODD_2+)	LO2+	9	◄·····►	6	RxO2+
LVDS_Out6+ (EVEN_2+)	LO6+	10	◄·····►	19	RxE2+
LVDS_Out2- (ODD_2-)	LO2-	11	◄·····►	5	RxO2-
LVDS_Out6- (EVEN_2-)	LO6-	12	◄·····►	18	RxE2-
Ground	GND	13			
Ground	GND	14	◄·····►	14	GND
LVDS_Out1+ (ODD_1+)	LO1+	15	◄·····►	4	RxO1+
LVDS_Out5+ (EVEN_1+)	LO5+	16	◄·····►	16	RxE1+
LVDS_Out1- (ODD_1-)	LO1-	17	◄·····►	3	RxO1-
LVDS_Out5- (EVEN_1-)	LO5-	18	◄·····►	15	RxE1-
Ground	GND	19			
Ground	GND	20	◄·····►	17	GND
LVDS_Out0+ (ODD_0+)	LO0+	21	◄·····►	2	RxO0+
LVDS_Out4+ (EVEN_0+)	LO4+	22	◄·····►	13	RxE0+
LVDS_Out0- (ODD_0-)	LO0-	23	◄·····►	1	RxO0-
LVDS_Out4- (EVEN_0-)	LO4-	24	◄·····►	12	RxE0-
Ground	GND	25	◄·····►	24	GND
Ground	GND	26	◄·····►	25	SEL LVDS
LVDS_CLK1+ (CLK_ODD+)	CLK1+	27	◄·····►	9	RxOC+
LVDS_CLK2+ (CLK_EVEN+)	CLK2+	28	◄·····►	21	RxEC+
LVDS_CLK1- (CLK_ODD-)	CLK1-	29	◄·····►	8	RxOC-
LVDS_CLK2- (CLK_EVEN-)	CLK2-	30	◄·····►	20	RxEC-
Ground	GND	31			
Ground	GND	32			
DDC-Clock	DDCCLK	33			
DDC-Data	DDCDATA	34			
LCD-Power 1)	+3.3V / +5V	35	◄·····►	28	Vcc
LCD-Power 1)	+3.3V / +5V	36	◄·····►	29	Vcc
LCD-Power 1)	+3.3V / +5V	37	◄·····►	30	Vcc
Ground	GND	38			
Ground	GND	39			
LCD_PowerOn	LCD_On	40	◄·····►	26	PD

24.5.1 Panel Pinout Sharp LQ190

Pin	Signal Name	Description
1	RxO0-	Negative differential input
2	RxO0+	Positive differential input
3	RxO1-	Negative differential input
4	RxO1+	Positive differential input
5	RxO2-	Negative differential input
6	RxO2+	Positive differential input
7	GND	Ground
8	RxOC-	Negative differential input
9	RxOC+	Positive differential input
10	RxO3-	Negative differential input
11	RxO3+	Positive differential input
12	RxE0-	Negative differential input
13	RxE0+	Positive differential input
14	GND	Ground
15	RxE1-	Negative differential input
16	RxE1+	Positive differential input
17	GND	Ground
18	RxE2-	Negative differential input
19	RxE2+	Positive differential input
20	RxEC-	Negative differential input
21	RxEC+	Positive differential input
22	RxE3-	Negative differential input
23	RxE3+	Positive differential input
24	GND	Ground
25	SEL LVDS	Select LVDS Mapping
26	PD	LVDS Core Power Down
27	TST	Test pin *1
28	Vcc	+5V power supply
29	Vcc	+5V power supply
30	Vcc	+5V power supply

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24.5.2 Inverter Cable Plan

conga-IGX				PowerSystems PS-DA0412-05	
Inverter-Connector JST PHR-8				B8B-PH-K (JST or equal)	
Signal	**Symbol**	**Pin**		**Pin**	**Symbol**
Ground	GND	1	◄·····►	7 (6)	GND
Ground	GND	2	◄·····►	5 (8)	GND
Backlight Brightness CTRL	tbd	3	◄·····►	11 (2)	BRT_Adj
Power 5V	VCC	4			
Power 5V	VCC	5			
Backlight On/Off Control	BL On/Off	6	◄·····►	9 (4)	BL On/Off
Power 12V	+12V	7	◄·····►	3 (10)	DC-In / 12V
Power 12V	+12V	8	◄·····►	1 (12)	DC-In / 12V
Pinout analog connector CN1 (mirrored to inverter spec, inverter pinout in brackets)					

24.6 Inverter Pinout PowerSystems PS-DA0412-05

Pin CN-1	Symbol	Remark
1;2;3	Vin	10.8 ~ 13.2 Vdc
4;5;6	GND	
7	Vbr	0 ~ 3.0 Vdc
8	Vrm t	0 ~ 0.5 = OFF / 3.3 ~ Vin = ON

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24.6.1 Sharp LQ150 LVDS Cable Pinout

conga-IGX				Sharp LQ150	
LVDS Connector Hirose DF13-40, straight, SMT				DF14H-20P-1.25H (Hirose)	
Signal	**Symbol**	**Pin**		**Pin**	**Symbol**
Ground	GND	1	◄·····►	3	GND
Ground	GND	2	◄·····►	4	GND
LVDS_Out3+ (ODD_3+)	LO3+	3	◄·····►	18	Rx3+
LVDS_Out7+ (EVEN_3+)	LO7+	4			
LVDS_Out3- (ODD_3-)	LO3-	5	◄·····►	17	Rx3-
LVDS_Out7- (EVEN_3-)	LO7-	6			
Ground	GND	7	◄·····►	7	GND
Ground	GND	8			
LVDS_Out2+ (ODD_2+)	LO2+	9	◄·····►	12	Rx2+
LVDS_Out6+ (EVEN_2+)	LO6+	10			
LVDS_Out2- (ODD_2-)	LO2-	11	◄·····►	11	Rx2-
LVDS_Out6- (EVEN_2-)	LO6-	12			
Ground	GND	13			
Ground	GND	14	◄·····►	10	GND
LVDS_Out1+ (ODD_1+)	LO1+	15	◄·····►	9	Rx1+
LVDS_Out5+ (EVEN_1+)	LO5+	16			
LVDS_Out1- (ODD_1-)	LO1-	17	◄·····►	8	Rx1-
LVDS_Out5- (EVEN_1-)	LO5-	18			
Ground	GND	19			
Ground	GND	20	◄·····►	13	GND
LVDS_Out0+ (ODD_0+)	LO0+	21	◄·····►	6	Rx0+
LVDS_Out4+ (EVEN_0+)	LO4+	22			
LVDS_Out0- (ODD_0-)	LO0-	23	◄·····►	5	Rx0-
LVDS_Out4- (EVEN_0-)	LO4-	24			
Ground	GND	25			
Ground	GND	26	◄·····►	16	GND
LVDS_CLK1+ (CLK_ODD+)	CLK1+	27	◄·····►	15	CK+
LVDS_CLK2+ (CLK_EVEN+)	CLK2+	28			
LVDS_CLK1- (CLK_ODD-)	CLK1-	29	◄·····►	14	CK-
LVDS_CLK2- (CLK_EVEN-)	CLK2-	30			
Ground	GND	31	◄·····►	19	GND
Ground	GND	32	◄·····►	20	GND
DDC-Clock	DDCCLK	33			
DDC-Data	DDCDATA	34			
LCD-Power 1)	+3.3V / +5V	35	◄·····►	1	Vcc
LCD-Power 1)	+3.3V / +5V	36	◄·····►	2	Vcc
LCD-Power 1)	+3.3V / +5V	37			
Ground	GND	38			
Ground	GND	39			
LCD_PowerOn	LCD_On	40			

24.6.2 Panel Pinout Sharp LQ150

Pin	Signal Name	Description
1	VCC	+3.3V Power supply
2	VCC	+3.3V Power supply
3	GND	GND
4	GND	GND
5	RxIN0-	LVDS receiver signal CH0 (-)
6	RxIN0+	LVDS receiver signal CH0 (+)
7	GND	GND
8	RxIN1-	LVDS receiver signal CH1 (-)
9	RxIN1+	LVDS receiver signal CH1 (+)
10	GND	GND
11	RxIN2-	LVDS receiver signal CH2 (-)
12	RxIN2+	LVDS receiver signal CH2 (+)
13	GND	GND
14	CK IN-	LVDS receiver signal CK (-)
15	CK IN+	LVDS receiver signal CK (+)
16	GND	GND
17	RxIN3-	LVDS receiver signal CH3 (-)
18	RxIN3+	LVDS receiver signal CH3 (+)
19	RL/UD	Horizontal/Vertical display mode select signal
20	SELLVDS	LVDS SET

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24.6.3 Inverter Cable Plan

conga-IGX				TDK CXA-0349	
Inverter-Connector JST PHR-8				JST PHR-7	
Signal	**Symbol**	**Pin**		**Pin**	**Symbol**
Ground	GND	1	◄·····►	3	GND
Ground	GND	2	◄·····►	4	GND
Backlight Brightness CTRL	tbd	3	◄·····►	5	BRT_Adj
Power 5V	VCC	4			
Power 5V	VCC	5			
Backlight On/Off Control	BL On/Off	6	◄·····►	7	BL On/Off
Power 12V	+12V	7	◄·····►	1	DC-In / 12V
Power 12V	+12V	8	◄·····►	2	DC-In / 12V

24.6.4 Inverter Pinout TDK CXA-0349

Pin	Symbol	Rating	Remark
1-2	Vin	10.8~13.2V	
3-4	GND		Ground
5	Vbr/Rbr	"0~2.5V /0~50kΩ"	Control
6	Vst (Output)	0V/5V	The warning output (5V in abnormal circumstances)
7	Vrmt	"0~0.4V/ 2.5V~Vin"	"0~0.4V:OFF 2.5V~Vin:ON"

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24.7 Philips LB121S03-TL01 LVDS Cable Pinout

conga-IGX				Philips LB121S03-TL01	
LVDS Connector Hirose DF13-40, straight, SMT				LS Cable GT100-20P-LS-SMT	
Signal	**Symbol**	**Pin**		**Pin**	**Symbol**
Ground	GND	1	◄·····►	3	GND
Ground	GND	2	◄·····►	4	GND
LVDS_Out3+ (ODD_3+)	LO3+	3			
LVDS_Out7+ (EVEN_3+)	LO7+	4			
LVDS_Out3- (ODD_3-)	LO3-	5			
LVDS_Out7- (EVEN_3-)	LO7-	6			
Ground	GND	7			
Ground	GND	8	◄·····►	13	GND
LVDS_Out2+ (ODD_2+)	LO2+	9	◄·····►	12	A3P
LVDS_Out6+ (EVEN_2+)	LO6+	10			
LVDS_Out2- (ODD_2-)	LO2-	11	◄·····►	11	A3M
LVDS_Out6- (EVEN_2-)	LO6-	12			
Ground	GND	13			
Ground	GND	14	◄·····►	10	GND
LVDS_Out1+ (ODD_1+)	LO1+	15	◄·····►	9	A2P
LVDS_Out5+ (EVEN_1+)	LO5+	16			
LVDS_Out1- (ODD_1-)	LO1-	17	◄·····►	8	A2M
LVDS_Out5- (EVEN_1-)	LO5-	18			
Ground	GND	19			
Ground	GND	20	◄·····►	7	GND
LVDS_Out0+ (ODD_0+)	LO0+	21	◄·····►	6	A1P
LVDS_Out4+ (EVEN_0+)	LO4+	22			
LVDS_Out0- (ODD_0-)	LO0-	23	◄·····►	5	A1M
LVDS_Out4- (EVEN_0-)	LO4-	24			
Ground	GND	25			
Ground	GND	26	◄·····►	16	GND
LVDS_CLK1+ (CLK_ODD+)	CLK1+	27	◄·····►	15	CLKP
LVDS_CLK2+ (CLK_EVEN+)	CLK2+	28			
LVDS_CLK1- (CLK_ODD-)	CLK1-	29	◄·····►	14	CLKM
LVDS_CLK2- (CLK_EVEN-)	CLK2-	30			
Ground	GND	31			
Ground	GND	32			
DDC-Clock	DDCCLK	33			
DDC-Data	DDCDATA	34			
LCD-Power 1)	+3.3V / +5V	35	◄·····►	1	VCC
LCD-Power 1)	+3.3V / +5V	36	◄·····►	2	VCC
LCD-Power 1)	+3.3V / +5V	37			
Ground	GND	38			
Ground	GND	39			
LCD_PowerOn	LCD_On	40			

24.7.1 Panel Pinout Philips LB121S03-TL01

Pin	Signal Name	Description
1	VCC	Power Supply, 3.3V Typ.
2	VCC	Power Supply, 3.3V Typ.
3	GND	Ground
4	GND	Ground
5	A1M	Negative LVDS differential data input
6	A1P	Positive LVDS differential data input
7	GND	Ground
8	A2M	Negative LVDS differential data input
9	A2P	Positive LVDS differential data input
10	GND	Ground
11	A3M	Negative LVDS differential data input
12	A3P	Positive LVDS differential data input
13	GND	Ground
14	CLKM	Negative LVDS differential clock input
15	CLKP	Positive LVDS differential clock input
16	GND	GND
17	NC	NC
18	NC	NC
19	NC	NC
20	NC	NC

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24.7.2 Inverter Cable Plan

conga-IGX				Green C&C GH001HB	
Inverter-Connector JST PHR-8				53261-1090 (MOLEX)	
Signal	**Symbol**	**Pin**		**Pin**	**Symbol**
Ground	GND	1	◄·····►	3	GND
Ground	GND	2	◄·····►	4	GND
Backlight Brightness CTRL	tbd	3	◄·····►	5	BRT_Adj
Power 5V	VCC	4			
Power 5V	VCC	5			
Backlight On/Off Control	BL On/Off	6	◄·····►	7	BL On/Off
Power 12V	+12V	7	◄·····►	1	DC-In / 12V
Power 12V	+12V	8	◄·····►	2	DC-In / 12V

24.7.3 Inverter Pinout Green C&C GH001HB

Pin	Symbol	Remark
1	BRT_ADJ	0 ~ 5V
3,4,7,8	GND	GND
5	BL ON/OFF	CCFL Drive SIGNAL(Active HIGH)
2,6	N.C	
9,10	DC-IN(Vin)	DC INPUT Power (12V)

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24.8 NEC NL6448BC33-63D LVDS Cable Pinout

conga-IGX				NEC NL6448BC33-63D	
LVDS Connector Hirose DF13-40, straight, SMT				JAE FI-S20S	
Signal	**Symbol**	**Pin**		**Pin**	**Symbol**
Ground	GND	1	◄·····►	3	Scan direction
Ground	GND	2	◄·····►	4	Colors
LVDS_Out3+ (ODD_3+)	LO3+	3	◄·····►	1	D3+
LVDS_Out7+ (EVEN_3+)	LO7+	4			
LVDS_Out3- (ODD_3-)	LO3-	5	◄·····►	2	D3-
LVDS_Out7- (EVEN_3-)	LO7-	6			
Ground	GND	7			
Ground	GND	8	◄·····►	5	GND
LVDS_Out2+ (ODD_2+)	LO2+	9	◄·····►	9	D2+
LVDS_Out6+ (EVEN_2+)	LO6+	10			
LVDS_Out2- (ODD_2-)	LO2-	11	◄·····►	10	D2-
LVDS_Out6- (EVEN_2-)	LO6-	12			
Ground	GND	13	◄·····►	11	GND
Ground	GND	14			
LVDS_Out1+ (ODD_1+)	LO1+	15	◄·····►	12	D1+
LVDS_Out5+ (EVEN_1+)	LO5+	16			
LVDS_Out1- (ODD_1-)	LO1-	17	◄·····►	13	D1-
LVDS_Out5- (EVEN_1-)	LO5-	18			
Ground	GND	19	◄·····►	14	GND
Ground	GND	20			
LVDS_Out0+ (ODD_0+)	LO0+	21	◄·····►	15	D0+
LVDS_Out4+ (EVEN_0+)	LO4+	22			
LVDS_Out0- (ODD_0-)	LO0-	23	◄·····►	16	D0-
LVDS_Out4- (EVEN_0-)	LO4-	24			
Ground	GND	25	◄·····►	17	GND
Ground	GND	26	◄·····►	18	GND
LVDS_CLK1+ (CLK_ODD+)	CLK1+	27	◄·····►	6	CLK+
LVDS_CLK2+ (CLK_EVEN+)	CLK2+	28			
LVDS_CLK1- (CLK_ODD-)	CLK1-	29	◄·····►	7	CLK-
LVDS_CLK2- (CLK_EVEN-)	CLK2-	30			
Ground	GND	31	◄·····►	8	GND
Ground	GND	32			
DDC-Clock	DDCCLK	33			
DDC-Data	DDCDATA	34			
LCD-Power 1)	+3.3V / +5V	35	◄·····►	19	VCC
LCD-Power 1)	+3.3V / +5V	36	◄·····►	20	VCC
LCD-Power 1)	+3.3V / +5V	37			
Ground	GND	38			
Ground	GND	39			
LCD_PowerOn	LCD_On	40			
1) selectable via Jumper					

24.8.1 Panel Pinout NEC NL6448BC33-63D

Pin	Signal Name	Description
1A	D3+	Pixel Data
1B	GND	Ground
2A	D3-	Pixel Data
2B	GND	Ground
3	DPS	"Selection of scan direction High: Reverse scan, Low or Open: Normal scan"
4	FRC	"Selectikon of the number of colors High: 16,777,216 colors, Low: 262,144 colors"
5	GND	Ground
6	CLK+	Pixel Clock
7	CLK-	Pixel Clock
8	GND	Ground
9	D2+	Pixel Clock
10	D2-	Pixel Clock
11	GND	Ground
12	D1+	Pixel Clock
13	D1-	Pixel Clock
14	GND	Ground
15	D0+	Pixel Clock
16	D0-	Pixel Clock
17	GND	Ground
18	GND	Ground
19	VCC	Power supply, typ. 3.3 V / 310 mA
20	VCC	Power supply, typ. 3.3 V / 310 mA

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24.8.2 Inverter Cable Plan

conga-IGX				NEC 104PW201	
Inverter-Connector JST PHR-8				53261-0871 (MOLEX)	
Signal	**Symbol**	**Pin**		**Pin**	**Symbol**
Ground	GND	1	◄·····►	3, 4 [2]	GND
Ground	GND	2	◄·····►	7	BRTH
Backlight Brightness CTRL	tbd	3	◄·····►	6	BRT_Adj
Power 5V	VCC	4			
Power 5V	VCC	5			
Backlight On/Off Control	BL On/Off	6	◄·····►	5	BL On/Off
Power 12V	+12V	7	◄·····►	1	DC-In / 12V
Power 12V	+12V	8	◄·····►	2	DC-In / 12V
[2] if impossible then connect pin 3 only					

24.8.3 Inverter Pinout NEC 104PW201

Pin	Symbol	Remark
1-2	VDDB	Power supply
3-4	GNDB	Ground
5	BRTC	"Backlight ON/OFF Open or High: ON Low: OFF"
6	BRTI	Luminance control terminal
7	BRTH	Luminance control terminal
8	AM	Altert signal for malfunction

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24.9 Philips LM150X08 LVDS Cable Pinout

conga-IGX				Philips LM150X08	
LVDS Connector Hirose DF13-40, straight, SMT				DF-14H-20P-1.25H (Hirose) or CWY20G-A0D1T (PTWO)	
Signal	**Symbol**	**Pin**		**Pin**	**Symbol**
Ground	GND	1			
Ground	GND	2	◄·····►	20	GND
LVDS_Out3+ (ODD_3+)	LO3+	3	◄·····►	18	RxIN3+
LVDS_Out7+ (EVEN_3+)	LO7+	4			
LVDS_Out3- (ODD_3-)	LO3-	5	◄·····►	17	RxIN3-
LVDS_Out7- (EVEN_3-)	LO7-	6			
Ground	GND	7	◄·····►	3	GND
Ground	GND	8	◄·····►	4	GND
LVDS_Out2+ (ODD_2+)	LO2+	9	◄·····►	12	RxIN2+
LVDS_Out6+ (EVEN_2+)	LO6+	10			
LVDS_Out2- (ODD_2-)	LO2-	11	◄·····►	11	RxIN2-
LVDS_Out6- (EVEN_2-)	LO6-	12			
Ground	GND	13			
Ground	GND	14	◄·····►	7	GND
LVDS_Out1+ (ODD_1+)	LO1+	15	◄·····►	9	RxIN1+
LVDS_Out5+ (EVEN_1+)	LO5+	16			
LVDS_Out1- (ODD_1-)	LO1-	17	◄·····►	8	RxIN1-
LVDS_Out5- (EVEN_1-)	LO5-	18			
Ground	GND	19			
Ground	GND	20	◄·····►	10	GND
LVDS_Out0+ (ODD_0+)	LO0+	21	◄·····►	6	RxIN0+
LVDS_Out4+ (EVEN_0+)	LO4+	22			
LVDS_Out0- (ODD_0-)	LO0-	23	◄·····►	5	RxIN0-
LVDS_Out4- (EVEN_0-)	LO4-	24			
Ground	GND	25			
Ground	GND	26	◄·····►	13	GND
LVDS_CLK1+ (CLK_ODD+)	CLK1+	27	◄·····►	15	CKIN+
LVDS_CLK2+ (CLK_EVEN+)	CLK2+	28			
LVDS_CLK1- (CLK_ODD-)	CLK1-	29	◄·····►	14	CKIN-
LVDS_CLK2- (CLK_EVEN-)	CLK2-	30			
Ground	GND	31	◄·····►	16	GND
Ground	GND	32	◄·····►	19	GND
DDC-Clock	DDCCLK	33			
DDC-Data	DDCDATA	34			
LCD-Power 1)	+3.3V / +5V	35	◄·····►	1	VDD
LCD-Power 1)	+3.3V / +5V	36	◄·····►	2	VDD
LCD-Power 1)	+3.3V / +5V	37			
Ground	GND	38			
Ground	GND	39			
LCD_PowerOn	LCD_On	40			
1) selectable via Jumper					

24.9.1 Panel Pinout Philips LM150X08

Pin	Signal Name	Description
1	VDD	Power Supply, 3.3V (typical)
2	VDD	Power Supply, 3.3V (typical)
3	GND	Ground
4	GND	Ground
5	Rin0-	- LVDS differential data input
6	Rin0+	+ LVDS differential data input
7	GND	Ground
8	Rin1-	- LVDS differential data input
9	Rin1+	+ LVDS differential data input
10	GND	Ground
11	Rin2-	- LVDS differential data input
12	Rin2+	+ LVDS differential data input
13	GND	Ground
14	ClkIN-	- LVDS differential clock input
15	ClkIN+	+ LVDS differential clock input
16	GND	Ground
17	Rin3-	- LVDS differential data input *Note2
18	Rin3+	- LVDS differential data input *Note2
19	GND	Ground
20	GND	Ground

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24.9.2 Inverter Cable Plan

conga-IGX				Green C&C GH001A	
Inverter-Connector JST PHR-8				12505WR-10A00(P) (YEONHO) / EQUIVALENT	
Signal	**Symbol**	**Pin**		**Pin**	**Symbol**
Ground	GND	1	◄·····►	3	GND
Ground	GND	2	◄·····►	4	GND
Backlight Brightness CTRL	tbd	3	◄·····►	1	BRT_Adj
Power 5V	VCC	4			
Power 5V	VCC	5			
Backlight On/Off Control	BL On/Off	6	◄·····►	5	BL On/Off
Power 12V	+12V	7	◄·····►	9	DC-In / 12V
Power 12V	+12V	8	◄·····►	10	DC-In / 12V

24.9.3 Inverter Pinout Green C&C GH001A

Pin	Symbol	Remark
1	BRT_ADJ	0 ~ 5V
3,4,7,8	GND	GND
5	BL ON/OFF	CCFL Drive SIGNAL(Active HIGHT)
2,6	N.C	
9,10	DC-IN(Vin)	DC INPUT Power (12V)

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